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# THE SCIENTIFIC MONTHLY

*EDITED BY J. McKEEN CATTELL*

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# Bowman's Andes of Southern Peru

By Isaiah Bowman, Director of the American Geographical Society. With topographic maps and illustrations from photographs. xi+336 pp. 8vo, $3.00 net.

This is the first volume in a noteworthy new series published by the American Geographical Society thru Henry Holt and Company. The series is written in a style that should appeal to the general reader, and at the same time to the explorer, the traveler, and the professional geographer. The series includes reprints of geographical classics; and also first printings of explorers' journals and rare manuscripts, as well as works of original scholarship.

One of the most striking features of the series is the excellence of the illustrations. No series yet issued in this country, outside government publications, have maps of such high quality. Moreover, the maps are distinctive and represent new discoveries in the fields of exploration and research.

The first half of this initial volume is largely narrative and so-called human geography; the second half deals with the physical geography of a section of Peru hitherto unexplored by a scientific expedition. The topics discussed include the Canyon of the Urubamba, the rubber forests, the forest Indians, the country of the shepherds, the coastal desert, regional topography, former glaciation, the development of cirques, the snow line of the tropics, crest lines of the Andes, and the climate of the Peruvian highland.

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THE SCIENTIFIC MONTHLY

APRIL, 1917

# A CALIFORNIAN ARBORETUM

By Professor DOUGLAS HOUGHTON CAMPBELL
STANFORD UNIVERSITY

FORTY years ago Governor Stanford purchased the Palo Alto ranch, now the site of Stanford University, and established his residence there. Shortly afterward, he conceived the idea of developing an arboretum in which might be found all of the trees and shrubs which could be grown in what is an exceptionally favorable region, even for California.

To this end a tract of about one hundred and sixty acres was set aside, and extensive plantings were made; but unfortunately whoever was responsible for the original planting evidently did not entirely appreciate the needs of many of the species that were selected, and consequently very many of these have not survived the vicissitudes to which the arboretum has been subjected since it was first laid out. For instance, a large number of trees from the Atlantic States were planted, without realizing that they are not at all adapted to withstand the long dry summer of California, and consequently the greater part of these have disappeared and the few that have survived have made very little growth.

On the other hand, many of the native species, and those from Australia and other countries similar in climate to California, not only have survived, but some of them have developed into superb specimen trees, and the arboretum at present contains magnificent examples of many notable native and exotic trees and shrubs.

For many years after Governor Stanford's death in 1893, conditions, financial and otherwise, made it impossible to develop the arboretum along the lines laid down by the founder. Recently, however, the trustees of the university have decided to continue the development of the arboretum, and have made provision for the acquisition of new plants, and the care of these.

The selection of the trees and shrubs and the general supervision of their planting and maintenance has been delegated to the department of botany of Stanford University, and it is hoped thus before long a

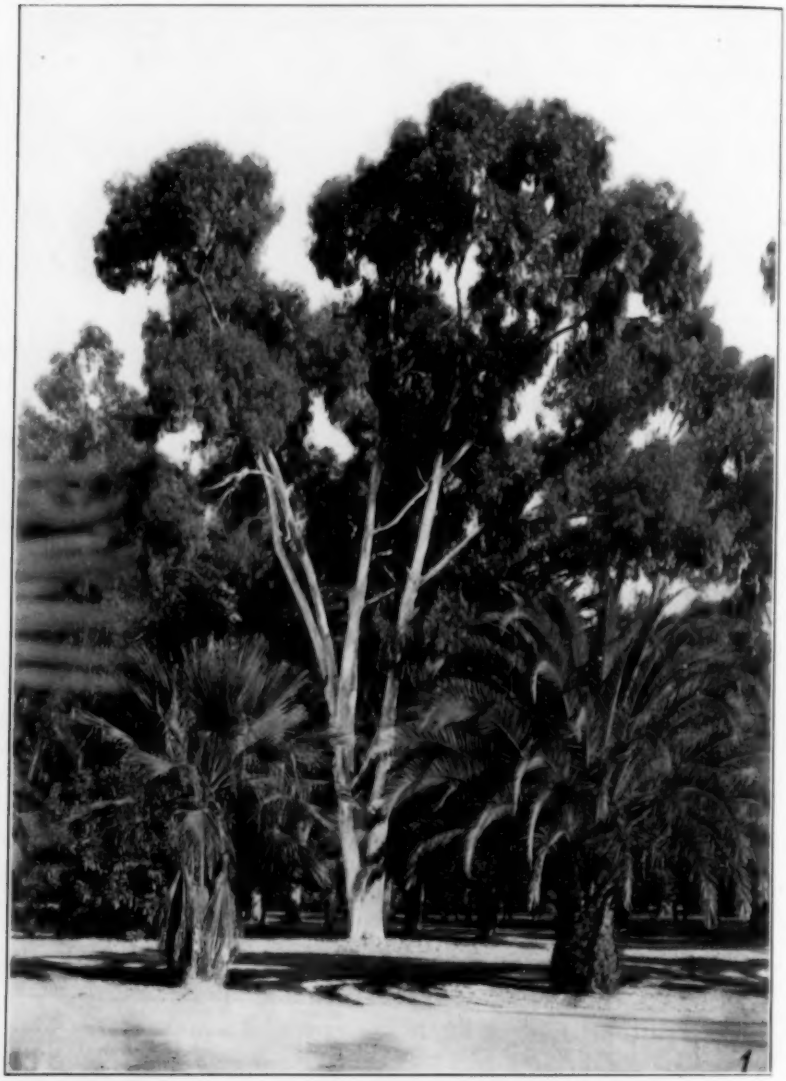

FIG. 1. A FINE SPECIMEN TREE, *Eucalyptus viminalis*.

really notable collection of native and exotic trees and shrubs will be assembled, and that students of horticulture and landscape gardening will find here an exceptional opportunity for studying the ornamental trees and shrubs that may be grown in this extraordinarily favorable locality.

Professor L. R. Abrams, who has consented to specially supervise the work, has already published[1] a brief statement of the plan which is proposed.

[1] *Science*, July 28, 1916, p. 128.

The first new plantings were made last spring, and it is expected that during the coming year substantial additions will be made to the existing collection.

Stanford University is situated on an estate of about 8,000 acres in the beautiful and fertile Santa Clara Valley, thirty miles south of San Francisco. Of this large area a considerable portion is still uncultivated, and furnishes excellent examples of the different plant formations characteristic of the region.

The topography is varied and picturesque, including parts of the level valley floor, but extending well into the foot hills of the Santa Cruz Mountains, which are 2,000 to 3,000 feet in height, and shelter the western side of the valley. The highest points on the Stanford estate are about 700 feet above San Francisco Bay. Much of the higher land is well wooded, and there may be found most of the trees and shrubs native to the valley—over sixty species have already been noted.

Recently the trustees of the university have set aside as botanical reserves a number of the most interesting tracts of wild land, selected by the department of botany. It is planned to retain these permanently as examples of the indigenous flora of the region.

With the varied topography is combined an equal variety in the geological formations, so that the number of species that grow naturally on the estate is very large, and there is an abundance of material for all lines of botanical investigation.

The climate of the valley differs a good deal from that of the bay region nearer San Francisco, as the mountains to the west shut off most of the fog which prevails in San Francisco during much of the year, and especially in summer; and the cold ocean winds lose much of their force in passing over thirty miles of land.

The mean annual temperature at Stanford University is between 55 and 60 degrees F., slightly higher than that of San Francisco; but the extremes are decidedly more marked. Thus during the summer the maxima are much higher than in San Francisco, but the minima decidedly lower. For example, when the maximum and minimum were 65–55 degrees in San Francisco, they would probably be about 80–50 degrees at Stanford. Freezing temperatures are extremely rare in San Francisco, while in the Santa Clara Valley, quite sharp frost early in the morning is a common phenomenon in midwinter. Freezing temperatures in the daytime, however, are never experienced, although before sunrise temperatures as low as 20 degrees have been recorded, and naturally tender plants suffer seriously, or may be killed when such cold occurs. In most winters, however, heliotrope, nasturtiums and similar tender plants escape without damage except in very exposed situations.

The summer months are normally quite rainless, and the total pre-

FIG. 2. CALIFORNIAN LIVE OAK, *Quercus agrifolia*.

cipitation (mostly from October to May) is seldom more than 20 inches, and usually less. In the foothill region, however, it is noticeably greater.

The lowest temperatures usually occur in December and January, when light frosts are quite common, but usually not sufficient to damage any but the tenderest plants. The usual winter maxima are 50 to 60 degrees, and the winter is a period of active growth.

The climate much resembles that of warmer parts of the Mediterranean region, and the same plants are met with. Olives, figs, vines and all of the "deciduous" fruits thrive, and the citrus fruits—oranges, lemons and grapefruit, are easily grown, but are seldom planted on a commercial scale. Palms of several species, including the native fan-palm (*Washingtonia*), are very commonly planted and the gardens are adorned with a great variety of evergreen trees and shrubs from various parts of the world.

The proximity of the ocean tempers remarkably the summer climate of the whole coast region, which offers a strong contrast to the intense heat and dryness of the central valleys and the southeastern part of the state. This temperate summer makes it possible to grow to great perfection most of the plants of northern Europe, which do not thrive in the hotter and drier parts of California.

It is evident then that climatically the conditions at Stanford are extremely favorable for the growth of a very large number of species;

and with irrigation, and slight winter protection, the number may be greatly increased.

The arboretum at present comprises about 200 acres, but in addition to this there are extensive plantations about the university buildings and the Stanford residence. These latter plantations include many unusually fine specimens of both native and exotic trees and shrubs.

As might be expected in California, so famous for its native coniferous trees, the Conifers constitute a conspicuous feature of the arbo-

FIG. 3. REDWOODS PLANTED IN 1880. The taller tree is 110 feet in height.

retum. The two Sequoias, *S. gigantea* and the coast redwood, *S. sempervirens,* are represented by numerous specimens, including avenues of each species. The finest specimens, however, are trees near the Stanford residence, planted nearly forty years ago. The date of planting of these trees is recorded on tablets placed by them, and they afford a valuable record of the rate of growth of these trees under specially favorable conditions.

The most remarkable are two redwoods (Fig. 3) planted by President and Mrs. Hayes in 1880. The taller of the two is now 110 feet in height with a girth of 8 feet, 8 inches, at five feet elevation. The other, while not so tall, has a girth of exactly ten feet.

Most of the other characteristic genera of native Conifers: *Pinus, Abies, Thuja, Libocedrus, Cupressus, Torreya, Pseudotsuga,* are well represented by numerous examples. The Monterey pine (*Pinus radiata*) and Monterey cypress (*Cupressus macrocarpa*) are by far the most frequently planted.

The Eastern species of Conifers are not quite at home in California, and there is but a meager representation of these. The southern cypress (*Taxodium*) and the white pine, however, do fairly well.

Many exotic Conifers grow luxuriantly, and there is already an excellent collection. The oriental cedars (*Cedrus*) are well represented by numerous thrifty trees of all three species, *i. e.,* the cedar of Lebanon, the deodar, the Atlas cedar, all of which are very much at home. Several species of *Araucaria* represent this interesting section of Coniferæ, and various species of pines, firs, spruces, arbor vitæ, yews, Cryptomeria, etc., from different parts of the Old World, make the collection already established decidedly worth seeing, and it is expected that the number of these exotic Conifers will soon be materially increased.

Eucalypti of several species were freely planted when the arboretum was originally laid out, partly as a shelter for more delicate trees. These are now large trees and it will be necessary, from time to time, to remove a good many of them to make way for other trees. Some of these great *Eucalyptus* trees are magnificent specimens of their kind, and will be permanently retained, as they form one of the most striking features of the arboretum. The majority are the common blue gum (*E. globulus*), but there are many specimens of several other species, and in time the number of species of *Eucalyptus* will be much increased, as this characteristic Australian genus finds a most congenial home in California.

Among the native broad-leaved trees, the most abundant are the three common valley oaks, *Quercus lobata, Q. Douglasii* and *Q. agrifolia,* which are common everywhere in the neighborhood of the university. Other striking species are the Madroño (*Arbutus Menziesii*),

FIG. 4. AVENUE THROUGH THE ARBORETUM, SHOWING BLUE-GUMS, *Eucalyptus globulus*.

the bay (*Umbellularia Californica*), buckeye (*Æsculus Californica*), big-leaved maple (*Acer macrophyllum*). Other native trees and shrubs are freely planted, or grow spontaneously in and near the arboretum. Among the finest shrubs are species of manzanita (*Arctostaphylos*), "Toyon" or Christmas berry (*Heteromeles*) and several showy species of *Ribes*.

Aside from the Conifers already referred to, most of the exotic trees

FIG. 5. IN THE "ARIZONA GARDEN."

and shrubs are unknown in the parks and gardens of the Atlantic States. A few, such as the European elms, ashes, horse-chestnuts, maples and sycamores are old friends, and a small number of species from the Atlantic States will be recognized, but for the most part, both trees and shrubs are strangers to the Eastern horticulturist. The Australian eucalypts, acacias, grevilleas, pittosporums and sterculias; the new Zealand veronicas, cordylines and coprosma; the Mediterranean myrtle, laurels, cistus, oleanders, brooms, etc., the pepper tree and other

FIG. 6. MAIDENHAIR TREE, *Ginkgo biloba*.

unfamiliar South American contributions, with still others from South Africa and Mexico, give the arboretum a very different aspect from that of any similar collection in the Atlantic States.

The majority of these are evergreen and many are now trees of great size, which afford a splendid setting for future plantings. It will be necessary from time to time, as we have said, to remove some of the older trees to make room for new plantings, but this will be done as carefully as possible.

FIG. 7. PALM AVENUE.

Among the unusual features of the present arboretum is the "Arizona Garden," which contains very fine specimens of various xerophytic plants, especially cacti in considerable variety. Here may be seen fruiting specimens of the giant *Cereus* of Arizona, as well as huge plants of the common prickly pear, and other species of *Opuntia*. With these are associated various species of yucca, century plants, aloes, mesembryanthemum, and other characteristic plants of warm and arid countries.

The plans for the future development will have to be made somewhat gradually. As far as possible the species of the same family will be grouped together, but as the arboretum is part of the ornamental grounds of the university, it will be necessary to bear this in mind, and, so far as possible, to combine the scientific arrangement with the most advantageous landscape effects. Moreover, the cultivational needs of the different species must be taken into account. In a climate where for six months no rain may fall, the question of irrigation is an all-important one, and the water needs of the plants must largely control their position in the arboretum.

A special effort will be made to have as complete a collection as possible of the woody plants of California. The flora of the state comprises a very large number of extremely beautiful and interesting trees and shrubs, a fair number of which are already represented, but a much larger number of which are still to be planted. The many exotic species which thrive in California will, however, receive due attention.

The climate of most parts of California is not naturally adapted to the plants of Atlantic North America, as these need for their normal growth the hot humid summer of the East. The same conditions are necessary for most of the Japanese and Chinese species. If these are planted where they can be freely irrigated during the summer they grow luxuriantly, but few of them can endure the long dry summer without irrigation. When such trees as the American elm, white ash, or *Magnolia grandiflora* are planted in a lawn, which has to be frequently watered, they grow vigorously and soon form good-sized trees.

There are a great many species from the drier warm temperate regions of the world, which are very much at home in California, and which once established require very little attention. Thus many of the Australian eucalypts and acacias grow with amazing rapidity, and a long list of Australasian genera are abundantly represented in our Californian gardens and parks. The Mediterranean region furnishes a large assortment—laurels, evergreen oaks, carobs, heaths, cypresses, etc.—all of which do quite as well in California as on the Riviera. South Africa has its quota of beautiful shrubs and herbaceous plants, and the warm temperate countries of South America—Peru, Chile, Brazil and Argentina—have contributed a host of showy species, pepper trees, fuchsias, heliotrope, passion flowers, bignonias, bougainvillea, etc.

As in all of the warmer parts of California, palms are extensively grown, and although their growth is decidedly slower at Stanford than in Southern California, they nevertheless are very commonly planted,

FIG. 8. GROUP OF PALMS IN THE QUADRANGLE.

and give a marked tropical touch to the landscape. On the university grounds at present there are grown some eight or ten species, and the palm avenue leading from the entrance of the estate and traversing the arboretum, a distance of nearly a mile, will attract the attention of the most casual visitor. There are some fine groups of palms, also, in the inner quadrangle of the university (Fig. 8). The arborescent yuccas, dracænas and cordylines are also freely planted in the university grounds.

It is therefore evident that there is a very wide field from which to select, comprising, probably, several thousand species which can be grown successfully in the arboretum as it is now being developed. Just how many, time will tell.

The writer is indebted to Professor L. L. Burlingame, of the department of botany of Stanford University, for the photographs used here as illustrations.

# LIFE INSURANCE PROBLEMS[1]

## THRIFT FROM THE LIFE INSURANCE VIEWPOINT

By ELMER E. RITTENHOUSE
NEW YORK CITY

LIFE insurance has been diligently working in the thrift vineyard for many years. For more than two generations it has been carrying its message of providence, of rational economy, of preparedness against adversity, into the homes of our people. Its greatest foe has been extravagance and the spendthrift tendency of the times. But in spite of these enemies, it has induced a vast body of Americans to conserve at least some of the fruits of their thrift. Its success has been far beyond the wildest dreams of its pioneers. It has not only been successful in promoting thrift, but through the investments of the immense accumulation of savings of its patrons, it is helping to keep the wheels of progress in motion by helping to develop commerce and the resources of our country. It has become a mighty constructive factor in our national life. It has observed the (per capita) wealth of our people increase over 500 per cent. in sixty years, and bring with it a train of new and costly living conditions.

In these days of prosperity, prodigality and waste, almost any man can earn money, but it takes a wise man to induce him to save much of it. We have an excessive number of people who are living up their entire earnings; we have many living beyond their means and mortgaging their future earning power in the pursuit of pleasure and luxury. Their motto is: "Be a sport, spend it to-day; to-morrow may not come." But to-morrow does come. And then, minus earning power, their pride and independence is suddenly changed to humiliation, and dependence upon others for their daily bread.

Scattered throughout the homes of our land, from miserable shacks to humble and pretentious cottages and dwellings, and even in mansions, are thousands of dependent people who have passed out of their earning period financially helpless. But still their fate holds no lesson for many people. With all our wealth and pride and independence, we still have a large number of men who are willing to leave their families

[1] Papers presented before the Section of Social and Economic Science of the American Association for the Advancement of Science, December 28 and 29, 1916, and communicated to THE SCIENTIFIC MONTHLY by the secretary of the section, Seymour A. Loomis.

to eat the bread of charity from the reluctant hands of relatives or of the state, rather than to practise a little economy and to provide them at least with life insurance protection.

We rejoice to know that our prosperity is unprecedented, that we have more homes, more schools, more savings bank deposits, more food, more clothes and more time for pleasure than ever before, but we must not forget that the worthy poor, as well as the improvident and wasteful poor, are still with us. It is a glorious thing to know that so far as necessities and comforts are concerned our people have a higher standard of living than those of other countries, but this can not serve as an excuse for them to abandon all prudence in expenditures and to wallow in costly luxuries and pleasures, oblivious of the lean, non-productive years that are to come.

There are still several millions of Americans needing life insurance, and this number is augmented every year by the young who reach the insurable age. To these people life insurance is appealing with steadily increasing success. But it does not succeed by trying to frighten people into the fold. It is useless to point to the fate of Persia, Athens, Rome or Bourbon France. It points to a lesson nearer home. It appeals to the man who wants to be independent instead of dependent in his old age. It appeals to his natural desire to protect "his own" against the chilly blasts of adversity when he can no longer protect them. These are the sort of people who constitute the vast army of breadwinners who carry life insurance in our country. These are the people who have made it possible for the American companies to place in force more life insurance than all the rest of the world combined. These are the people who have taken upon themselves the most stupendous financial obligation for the benefit of others the world has ever known. A more magnificent monument to unselfish thrift could not be conceived than the immense and growing volume of American life insurance.

But even in the operations of this great thrift-promoting institution we find striking evidences of the extravagance and improvidence prevailing among a large portion of our people. In contemplating the marvelous achievements of American life insurance, we are apt to overlook the costly obstacles that obstruct the path of its managers. Owing to a peculiar phase of human nature, the individual will not take the initiative. He will go to stores to buy the necessities and luxuries of life, he will go to the bank to deposit his money, he will even seek fire insurance, but he will not go to the life insurance office and apply for protection. Life insurance like religion must constantly be preached and urged upon him. He knows that he should have this protection, but it takes the most tactful and persistent pleading to induce him to act upon his conviction. The insurance missionary must call upon him anywhere from one to half a dozen times, a process which may cover a period of

weeks or months, before he will sign the application and appear for physical examination. And even after all this patient work, only a fraction of those solicited take insurance. Surely the life insurance thrift missionary is a most deserving public benefactor.

After the individual is insured, comes the difficult task of keeping him insured. The same improvident tendency which accounts for the reluctance of so many to take insurance induces these people to lapse or abandon it upon slight excuse. No more striking evidence of the spendthrift tendencies of our people can be found than in the waste resulting from the needless lapse and surrender of life insurance policies. It is true that many of these lapses are due to financial reverses, but the practise of a little economy would prevent the most of this loss which includes not only the insurance protection but the cost of putting it on the books.

Life insurance companies are deeply concerned in keeping this waste, for which the policyholder is responsible, at the lowest possible point, but long experience has demonstrated that it is one of the permanent unavoidable expenses of the business. The following table indicates the new business written and the old business lost by lapse and surrender during the past thirty years by companies reporting to the New York State Insurance Department:

| Year | New Insurance Written, Millions | Insurance Lost by Lapse and Surrender, Millions | Ratio Loss to New Insurance (Per Cent.) |
|---|---|---|---|
| 1885 | $327 | $123 | 37.6 |
| 1890 | 726 | 240 | 33.1 |
| 1895 | 769 | 418 | 54.4 |
| 1900 | 1,230 | 425 | 34.6 |
| 1905 | 1,562 | 644 | 41.2 |
| 1910 | 1,363 | 514 | 37.7 |
| 1915 | 1,928 | 818 | 42.4 |

It will be noted that the extraordinary progress of American life insurance has been made in spite of the fact that in many years, owing to the lapsing habit, it had to advance three steps to get ahead two. In some years the increase has been cut in half by the same cause. It is estimated that it cost the policyholders over 28 million dollars to put on the books the 818 million dollars of insurance which they voluntarily abandoned in 1915.

Another impressive evidence of the tendency of our people to succumb to the temptation to withdraw and spend savings which they have deposited, is found in the extraordinary increase in the money borrowed by policyholders from their insurance reserves during recent years. This is indicated in the following table which relates to all American companies:

| Year | Loans to Policy Holders | Per Cent. of Loans to Reserves |
|---|---|---|
| 1890 | $19,903,242 | 3.0 |
| 1895 | 35,524,530 | 3.6 |
| 1900 | 88,500,575 | 6.1 |
| 1905 | 225,568,149 | 9.8 |
| 1910 | 495,099,854 | 15.4 |
| 1915 | 779,158,909 | 17.9 |

In thus withdrawing their reserves policyholders are in effect borrowing from the widow and orphan. Only about ten per cent. of these loans are repaid, and, therefore, must be deducted from the insurance money when the claim is paid. While this practise, which is now authorized by law, is a great convenience in time of financial stress, it also operates greatly to the disadvantage of the beneficiary, and, in a sense, neutralizes the purpose for which the insurance was taken. Moreover it is an encouragement to the wasteful tendency of the day and should be restricted to premium-paying purposes only.

It may seem idle to assemble statistics to demonstrate our most conspicuously obvious trait, extravagance, but the temptation to do so to impress the mind with the magnitude of the problem is not easy to resist. The following information may also assist in a better understanding of the institution of life insurance. The amount spent annually by our people for automobiles would give every married woman in the United States, rich and poor alike, $1,000 of life insurance protection. The money saved from a 30 per cent. reduction in the yearly consumption of intoxicating drinks, tobacco, jewelry and confectionery would give every married woman in the United States, $2,000 of life insurance protection. The total amount spent annually for intoxicating drinks would buy each married woman in the United States, $3,500 of life insurance. Every insurable person in the United States could have an average of $1,000 of life insurance by saving the price of a daily ten cent cigar.

It is equally interesting, and far more gratifying to try to visualize the wonderful contribution to human happiness which our people have made through their life insurance deposits. It may be well to note first a fact indicating the public-service character of the institution of life insurance. It returns nearly all of its savings and earnings to policyholders, as most of the companies are on the mutual or participating plan. The combined companies, stock and mutual, operating in the state of New York have returned savings and earnings as follows:

| | Dividends | Per Cent. |
|---|---|---|
| **In 50 years:** | | |
| **To policyholders** | **$1,423,000,000** | **97.7** |
| **To stockholders** | **34,000,000** | **2.3** |
| **In 1915:** | | |
| **To policyholders** | **106,065,500** | **98.7** |
| **To stockholders** | **1,446,729** | **1.3** |

From this it should be clear to every mind that life insurance is a real public service institution and should not be classed with ordinary profit-making enterprises in considering corporation problems. It should also be remembered that in this business the freest competition exists and that no combination to charge unfair rates is possible.

In the *Spectator Year Book* is found a brief analysis of the business of 187 life insurance companies since their organization. The oldest of these companies has existed 73 years; 126 of them are less than fifteen years old. These companies have paid in death claims since their organization to date, in round figures, 4 billion dollars which is more than the total money in circulation in the United States. This sum would give 608 thousand widows and orphans three meals a day for twenty years. It would provide 800 thousand cottage homes at five thousand dollars each. It has sustained a vast number of people in the hour of their greatest need and has assisted in the education of a multitude of orphaned children.

It is especially impressive when we stop to think that but for the institution of life insurance and the urging of life insurance missionaries, virtually all of this vast sum would have been frittered away in small and needless expenditures, and that the great human service which it has performed would have been lost to our people. In addition to this sum paid to beneficiaries these companies since their organization also paid, in round figures, to policyholders in endowments and annuities 966 million dollars and for surrendered policies 1,488 million dollars and in dividends 1,450 million dollars, making their total payment to beneficiaries and policyholders nearly eight billion dollars. And they still have on hand in assets 5,140 million dollars, chiefly in reserves. These assets exceed the total deposits in the savings banks of the United States. They would pay the national debt almost five times over. Back of these assets is the most stupendous obligation for human welfare ever undertaken by a people. There is over 22 billion dollars in legal reserve life insurance now in force in American companies.

We may comprehend at least to some degree the magnitude of this wonderful monument to the persistency and efficiency of life insurance men in promoting the saving habit by using the simple method of visualizing the dollar bill—a document with which some of us may be familiar. Let us put this 22 billion dollars of life insurance in a strip of one dollar bills. In this form they would reach from New York to San Francisco 763.6 times and cover the ground to a width of 191 feet clear across the continent. They could belt the earth at the Equator 97.7 times at a width of 24 feet. They would reach from the earth to the moon (238,850 miles) ten times in a streamer 2½ feet wide. If it were possible to count this sum continuously at the rate of one bill per second during every eight-hour working day, it would take one man 2,521 years

or 1,000 men 2½ years to complete the job. This may be a common and fanciful method of attempting to comprehend a large sum of money but any plan is permissible that will convey, even in a degree, to the average mind the immensity of the contribution to human welfare which the American people have given and arranged for through the instrumentality of life insurance.

It must be remembered that thanks to the life insurance reserve plan, every one of these 22 billion dollars will actually and certainly be paid to beneficiaries if the premium payer fulfills his part of the contract. Last year the work of meeting this stupendous obligation went on at the rate of $783,470 per working day in death claims. This steady stream of gold is being poured into the laps of the widows and orphans of our country at the rate of $1,632 per minute for every eight hours of every working day in the year. Its volume is increasing daily under the influence of the life insurance missionaries who are at work in every city, village and hamlet of the land teaching thrift and the conservation of its fruits.

From this brief and informal review, an idea may be gained of the work life insurance has already done and is now doing in the field of thrift education. By closer cooperation between the various agencies concerned in this problem, including the press, much progress can be made. In this connection, policyholders would be wise to deposit their premiums in weekly or monthly installments in banks and have their premium payments made by the bank to avoid the possibility of lapsing through oversight. Some banks are already advertising for such deposits. Heretofore, when the rapid drive of American progress has run us into danger, wise leaders have set in motion a public sentiment or other force which has guided us safely from the threatening peril. Let us hope that a similar service may result from the thrift educational movement. May it take definite, permanent and national form and grow in strength and influence until its message is firmly fixed in the mind of every American.

## SOME FALLACIES OF COMPULSORY HEALTH INSURANCE

By FREDERICK L. HOFFMAN, LL.D.

STATISTICIAN, PRUDENTIAL INSURANCE COMPANY OF AMERICA

THE public discussion of compulsory health insurance has assumed an exceedingly dangerous phase. The discussion has become a question of practical politics in that it underlies a contemplated movement for state legislation more or less contrary to long-established principles of our government. Compulsion or coercion in matters of social

reform is antagonistic to our American conceptions of personal freedom in a democracy. Compulsion should be the last resort under any form of goverment, where voluntary effort can be relied upon to bring about more or less identical results. The remarkable progress which this country has made has been largely on the basis of voluntary effort and initiative; and the evidence is quite conclusive that the forces which are making for progress, whether social or economic, can be relied upon to achieve even more satisfactory results in the future than has been the case in the past.

It is most unfortunate that the arguments in favor of compulsory health insurance should represent almost exclusively the views of half a dozen men in sympathy with the aims and ideals of neither organized labor nor of industry. The views of half a dozen men can not be relied upon as representative for the country at large, least of all when the principles as well as the facts advanced in support of their contention are open to serious contradiction and dispute.

The arguments which have been brought forward in behalf of compulsory health insurance are sustained by an appeal to alleged facts and conditions which will not bear analysis. The documentary evidence is entirely sufficient for the purpose to disprove practically every important assertion or allegation made by the very small group of men in question, who are neither experts in social insurance nor in matters of labor legislation and reform. European institutions have a curious fascination for this group of men who at best have made but a superficial inquiry into the actual facts. It is easy to understand why European antiquities should attract American tourists, but it is difficult to realize at the present time why European social institutions should be suggested by Amercan social reformers for imitation on the part of the citizenship of a free republic. If there is any one duty incumbent upon all who are concerned with the future of this country it is to *know America first,* and to thoroughly understand the facts and tendencies of our national life. Emphatic allegations as to the results achieved in European countries under social insurance are often difficult of contradiction on the part of the general public, out of touch with the documentary evidence or the results of actual experience.

A committee on social insurance was appointed by the American Association for Labor Legislation for the purpose of making a thorough and strictly scientific study of the subject. The committee during the three or four years of its investigations never concerned itself seriously with actual facts, but concentrated its efforts from the outset upon the perfection of a plan of compulsory insurance practically identical with the methods found more or less unsuccessful in European countries. The membership of the committee did not secure trustworthy information as to the workings in matters of detail of European plans of compulsory health insurance nor did it make an exhaustive investigation

into the workings of voluntary forms of thrift serving social insurance purposes in this country. In other words, the majority of the committee from the outset was determined to force upon the American people a compulsory system of health insurance after European models, regardless of the lack of necessity for such an innovation which, broadly speaking, must be considered contrary to the fundamental principles of government in a democracy.

At a time when all the energies of the people should be directed to public economy, it is proposed to inaugurate an enormous bureaucratic machine which in its ultimate ramifications would affect the entire life and well-being of the people. The contemplated legislation is made to rest upon the assertion that labor and health conditions in this country are thoroughly unsatisfactory. It is asserted in defense of the measure that "high sickness and death rates are prevalent among American wage-earners," when any one who runs may read that the American death rate at the present time is the lowest on record, and the death rate, broadly speaking, is a measure of the prevailing amount of serious illness. It is, therefore, to be categorically denied that, as asserted in the Brief for Health Insurance, "the amount of ill health at present existing among the wage-earners of America calls for vigorous social action for its cure and prevention," if the assertion means to imply that the only alternative is the establishment of compulsory health insurance. If the health conditions in industry or in the country at large are unsatisfactory, it is obviously because of the failure of the health and labor departments to do their duty; and the cure of whatever evils may exist lies in the direction of the enforcement of health and labor laws or their perfection, instead of in the establishment of a system of compulsory health insurance. But as a matter of fact, the existing amount of ill health in American industry is *not* excessive; nor, for that matter, in the country at large. This is but one of countless illustrations of the gross inaccuracy and obviously misleading character of the arguments brought forward in support of compulsory health insurance. There is neither the sanitary nor the economic necessity in this country for such a system which may possibly exist in certain European nations where wage-earners constitute a "class" separate and distinct from the remainder of the population.

It is also argued, for illustration, that "more extended provision for medical care among wage-earners is necessary," but no evidence is forthcoming that such care under existing conditions in this country constitutes a heavy burden on wage-earners' incomes or that the average income itself is insufficient to provide the medical attention required. Higher wages in the United States are of decidedly greater importance to wage-earners than a system of compulsory sickness insurance. Accepting the estimate of an annual income loss of $800,000,000 on account

of wage-earners' sickness, it would only require a wage increase of 10 cents a day to more than meet this amount. The low death rate of this country is in itself evidence of physical good health and a flat contradiction of the statement by the secretary of the American Association for Labor Legislation that "we have awakened to find that the physical stamina which wrested the American continent from the dominion of primeval nature is very rapidly disappearing." This statement is contrary to the facts; and it is equally untrue to assert that "all available statistics show that all forms of chronic diseases are more prevalent in America than anywhere else in the civilized world, and are also increasing more rapidly than in any other civilized country in the world." There are no such statistics and the allegation is merely guesswork opinion.

The argument is advanced in the Brief for Health Insurance that additional efforts to prevent sickness are necessary. In so far as such efforts are a matter of urgent necessity the existing sanitary organization, whether local, state or federal, can be relied upon to perform an even better service than has heretofore been the case when more adequate appropriations are forthcoming and when the qualifications for professional sanitary service are raised to a higher standard.

The assertion by the secretary of the American Association for Labor Legislation in this connection that the campaign against tuberculosis in Germany through the cooperation of social insurance institutions "has been one of the most effective battles against tuberculosis that the world has even seen," is quite contrary to the facts, for in this country, *without* compulsory health insurance, a more pronounced decline in the tuberculosis death rate has been secured during the last quarter century since social insurance has been in operation in the German Empire. Between 1880–1913 the tuberculosis death rate of Massachusetts was reduced 23.8 per 10,000, whereas the corresponding reduction in the mortality from tuberculosis in Prussia was only 17.6 per 10,000. The mortality from pulmonary tuberculosis in the city of New York during the year 1916 was the lowest on record in the history of that city. We have every reason to feel proud of our sanitary progress, and the duration of life in this country is measurably increasing. A low death rate is the best possible indication of a relatively high degree of vital resistance and physical strength. It is therefore absurd to argue that the wage-earners of this country are suffering physical deterioration.

In his article in *The Forecast* Dr. Andrews makes the statement that "in England the insurance laws have also stimulated a powerful national crusade against tuberculosis." And that "so powerfully indeed has this system operated with regard to placing responsibility for sickness where it belongs, that all the forces of the community are united in a fight against it." As a matter of fact, there has thus far been no

intelligent coordination; and the general death rate of England increased from 13.3 in 1912 to 14.0 in 1914. The tuberculosis death rate was only reduced from 13.8 per 10,000 in 1912 to 13.6 in 1914. Infant mortality actually increased from 9.5 per cent. in 1912 to 10.5 per cent. in 1914. There were 107,000 cases of scarlet fever notified in 1912, against 165,000 in 1915; there were 44,600 cases of diphtheria notified in 1912, against 59,300 cases in 1914; there were 8,262 cases of typhoid fever in 1912 against 8,778 in 1914; and, finally, 2,184 cases of puerperal fever in 1912 against 2,338 in 1914. There was, therefore, by no means the remarkable sanitary progress anticipated in consequence of the passage of the Insurance Act of 1911, which went into operation in 1912; but, to the contrary, health conditions were less satisfactory after two years' experience than before.

A large number of persons are still outside of the operation of the act, as best illustrated in the statement that according to the annual report of the Local Government Board for 1914–15 the number of tuberculosis cases examined at the dispensaries of the metropolis was 3,168 for insured cases and 13,660 for uninsured cases. At dispensaries outside the metropolis 25,865 insured cases were treated against 34,644 uninsured cases. It is therefore grossly misleading to assert that the main purpose of the National Health Insurance Act of Great Britain was "the conservation of health." The main purpose of the act was and is to furnish pecuniary support and medical treatment at reasonable cost during continued illness. The act has *not* primarily concerned itself with the conservation of health or the prevention of disease.

It is said that "existing agencies can not meet these needs." As an argument in support of this point of view a very brief report is published on voluntary health insurance agencies in New York City by a woman investigator without technical knowledge of insurance methods and results and without the cooperation of the State Insurance Department. There has been *no* thorough and qualified investigation of existing voluntary methods of insurance or related forms of thrift serving social insurance purposes. In the words of Bolton Hall, whose impartiality in a matter of this kind can not be questioned, "of the means to thrift life insurance ranks first in importance." For, as he observes, "the fundamental principle of thrift is continuous effort." And he concludes: "Insurance is a universal providence." And since "the most serious hindrance to progress is the uncertainty of life, insurance discounts this uncertainty by making it possible for most persons to provide for dependent survivors; also for illness, accident and old age." The amount of insurance in this country is enormous; but it is only one of many forms of wage-earners' thrift. Constant progress is being made and every year the methods are being further developed to meet changing conditions and new requirements. If sickness insurance has

not been extensively developed in this country through trade unions, fraternal societies, etc., it is largely because of the absence of a real necessity for such a system in the case of the vast majority of American wage-workers and their dependents.

If the average amount of sickness is 9 days per annum, and if the average wages are assumed to be $2 a day, then the annual financial loss per wage-worker is $18, of which under a compulsory insurance system he would be repaid to the extent of $12. That sum is not a sufficient economic inducement for the establishment of a universal system of sickness insurance. In more or less unhealthy trades, however, such as that represented by the International Cigar Makers' Union, sickness insurance benefits have been found advantageous, and since its organization that body has distributed over four million dollars in sick benefits, aside from more than four and a quarter million dollars of death benefits!

Throughout the country a large number of voluntary sickness insurance organizations have been established to the unquestionable advantage of their members. The benefits paid are usually small, so as to make sure that they shall not offer an inducement to malingering and fraud. Most unfortunate results in this respect have followed the introduction of every compulsory health insurance system, to the serious moral injury of those concerned; in other words, a liberal compulsory insurance system is a direct inducement to malingering and fraud, and the cost falls as a heavy burden upon the honest contributors, who, in each and every fund, constitute the vast majority of the membership.

It is entirely erroneous to maintain that "a large amount of disability exists among wage-earners on account of sickness," since the statistics of the Metropolitan Life Insurance Company for the cities of Rochester, Trenton and Boston indicate that the proportion of sickness of every degree is not now less than 3 per cent. When allowance is made for cases compensated for under workmen's compensation law, the proportion of really serious cases of illness among wage-earners falls below 2 per cent. per annum. Such a loss of labor time can easily be made good out of current wages, and the proper use of the credit function in the wage-earner's life.

Even more startling and misleading assertions are made by Dr. B. S. Warren, surgeon of the U. S. Public Health Service, who rests his propaganda for compulsory health insurance upon the obvious fallacy that "prevention is primarily the purpose of insurance." Prevention has nothing directly to do with insurance, which is simply an economic method for the equitable and rational distribution of losses. Dr. Warren, without any qualifications as an insurance expert, provides a provisional estimate to the effect that the annual cost of a liberal compulsory health insurance system will not exceed 50 cents a week. No

actuarial evidence has been forthcoming that this amount would be sufficient. According to Dr. Warren, modern industry is responsible for a considerable proportion of wage-earners' ill health. In so far as industry is responsible for occupational diseases, it is self-evident that such diseases should be provided for under workmen's compensation law, and not under a compulsory sickness insurance system. He also holds that irregular employment is a serious cause of ill health. No evidence has been forthcoming that there is a measurable relationship between unemployment and health. He concludes that a considerable proportion of our wage-earners are unable to provide a nourishing diet. If anywhere in the world wage-earners and their families are better provided for with wholesome and abundant food than in the United States, the evidence has not been forthcoming. If there is need of better education in nourishment or the nutritive value of food products, it is the duty of the medical schools of this country to provide such an education to the average medical practitioner. There is a vast amount of misleading information, but only a beginning has been made for intelligent instruction in the elements of a rational food economy. Experiments have shown that a healthy life can be maintained on a very much lesser proportion of expensive foods than has heretofore been considered possible. It, however, is wholly false to assert or to imply that "a considerable proportion of our wage-earners are unable to provide a nourishing diet."

Dr. Warren claims that poverty is the principal cause of disease. There is no evidence that there is any direct relation between poverty and the causation of typhoid fever, or of scarlet fever, puerperal fever, etc. Poverty and sickness unquestionably often complicate each other, but it is quite erroneous to maintain that poverty "is the principal cause of disease." Such a statement made by a physician of the Public Health Service is as regrettable as it is obviously misleading.

In the field of economics Dr. Warren's assertions are equally untrustworthy and contrary to the facts. He maintains, without any evidence whatever, that "employers generally have not measured up to their responsibilities." In no country in the world have employers of labor done more to improve health and working conditions than in the United States, and while much remains to be done, every foreign investigator comments upon the gratifying contrast between the sanitary condition of our factories and those abroad. Much of this is, of course, due to the fact that most of our large establishments at least are of modern construction, but nothing could be further from the truth than that "American employers generally have not measured up to their responsibilities."

Again and again Dr. Warren emphasizes his conclusion that the incomes of American wage-earners are insufficient for a healthy stand-

ard of living, yet no evidence has been forthcoming of physical deterioration, any more than allegations to this effect regarding the United Kingdom were found to be in accordance with the facts. The argument by Dr. Warren is finally summarized in the statement that "health insurance is essentially a public health measure." It unquestionably would be desirable to improve the health organizations of this country, whether federal, state or municipal; but such improvements as are desirable and as no doubt will be forthcoming in due course of time do not require or depend upon the establishment of a system of compulsory health insurance. As a matter of fact, such a system would seriously tend to disorganize existing health organizations and concentrate efforts upon matters only remotely related to the principal objects of sanitary science. In England the National Health Insurance Act has thoroughly disorganized the medical profession, and a vast amount of time which in former years was devoted to public discussions of medical problems is now required for interminable disputes concerning fees, prescriptions, over-prescribing, litigation, payment of bills, conflicts of interests, etc. What has compulsory health insurance to do with any of the essential elements of a public health administration? Among other objects, public health administration concerns itself with the collection, the removal and the disposal of refuse, garbage, etc., with soils and building sites, with warming and lighting, with air and ventilation, food and beverages, disinfection, the disposal of the dead, school hygiene, communicable diseases, hospitals and vital statistics. Why should any or all of these matters, of such urgent concern to all the people, be complicated as regards an effective administration by being included in the plan and scope of a compulsory health insurance system, primarily concerned with matters of pecuniary relief? In the words of Dr. I. M. Rubinow, in his work on "Health Insurance Standards," "the insured workman himself almost invariably looks upon the insurance plan from an entirely different angle, and while admitting in a half-hearted way that the medical feature has its value, is very much more concerned with the size of the weekly benefit he may expect when he is compelled to lay off because of ill health." This is a true statement regarding the underlying interest of wage-earners in any and all forms of compulsory insurance; and the statement flatly contradicts the assertion by Dr. Warren that compulsory health insurance is "essentially a public health matter." Unquestionably under the proposed plan there would be a very material increase in functions and an extensive bureaucratic organization would come into existence with the result that the life and daily activity of each and every wage-earner would be made more or less a matter of governmental supervision and control. Dr. Warren quotes a statement regarding the national health insurance administration of England, that the new system touches "nearly every field of human endeavor," but he

might have said with more truth that in course of time the system is certain to change into one of drastic individual medical supervision and control. According to Dr. Lambert no wage-earner in receipt of sick benefit can return to work without having first been examined by the medical referee, so that the services of an outside physician are interposed between the confidential relations of the sick patient and his family physician. In actual experience it would unquestionably be found that the results would *not* benefit the workmen but primarily the new bureaucratic organization which in course of time would be converted into a huge political machine.

These observations and conclusions are sufficient for the purpose of emphasizing the thoroughly untrustworthy nature of the arguments brought forward in support of compulsory health insurance. In contradiction of the assertions regarding the necessity for such a system it is maintained that far more satisfactory results can be secured by further improving existing methods and agencies serving practically identical purposes as those provided for under the contemplated system of compulsory health insurance.

It is not in the direction of new governmental agencies that there lies much if any hope for a betterment of existing conditions; but in the most thoroughgoing efficiency of existing methods, whether governmental or otherwise, serving social insurance purposes. By improving our health organization in the direction of more intelligent coordination of local, state and federal activities a vast amount of benefit may easily be made to result at relatively small expense. Such improvements are infinitely more desirable than the possible reduction in the sickness or the death rate through the medium of an exceedingly costly and burdensome system of social insurance. If the economic condition of our wage-earners is not what it should be, the struggle for higher wages and shorter hours through intelligent methods of collective bargaining is deserving of encouragement and the results thus secured will tend decidedly more to the advantage of wage-workers and their dependents than benefits gained by indirection through the establishment of a bureaucratic system of health insurance on the principle of coercion or compulsion, as the case may be.

The propaganda for compulsory health insurance has *not* the endorsement of the American Federation of Labor, which may justly be considered entitled to the highest possible consideration. It has not the endorsement of a large number of men and women who have given most serious thought to the problems of labor and industry. Those who have been heard from through a skilfully organized press propaganda are but a small group of the vast majority of the American people, to whose vital interest it is that the facts of the situation should be thoroughly understood. In its final analysis the propaganda is primarily a

measure in behalf of the efforts of the Socialistic Party, as best illustrated by the official statement by Dr. I. M. Rubinow, who was the official spokesman of the Socialistic Party on the occasion of the Congressional Hearings on Social Insurance, and who, in the American Labor Year Book for 1916, states that "whether health insurance is to become a real force for the betterment of the conditions of the wage-worker's life or whether it is to remain, like the American compensation legislation, a mere sop to the wage-worker, will largely depend upon the activity of the socialist movement." Thus favored by the Socialist Labor Party and opposed by the American Federation of Labor, the propaganda is made to rest upon the skilful and persistent dissemination of fallacies and falsehoods which are a matter of official record, and which can not be explained away.

The entire propaganda for compulsory health insurance is really an audacious attempt on the part of a very small group of men not representative of labor, industry or the public at large, to force upon the American people a system of state insurance resting upon the principle of coercion in matters which have heretofore been properly considered solely of private or individual concern. By asserting what is not true the impression is being created that there is the utmost urgency for the establishment of compulsory health insurance largely because of thoroughly unsatisfactory economic conditions on the one hand, and thoroughly unsatisfactory conditions of health and medical treatment on the other. The argument is made to rest upon unsupported assertions that European systems of social insurance have been an unqualified success, regardless of the fact that no thoroughly qualified and impartial investigation of European systems has been made by the United States government or through private enterprise. What has been published on the subject represents largely a reiteration of German official opinion, and not the results of an impartial analysis of the facts of insurance experience and social and economic problems more or less related thereto.

It has been well said of the National Insurance Act of Great Britain, in *The Hospital*, of November 18, 1916, that "it is difficult to imagine anything less businesslike than the manner in which national health insurance matters are being treated at the present time by the responsible officials." Comparing the present with the past, when contrary to good judgment a national health insurance act was forced upon the people, the same publication, which is of the highest standing, raises the question whether national insurance is once more "to be the plaything of party politics." And in connection therewith it is pointed out that it becomes increasingly difficult "to understand why needed business reforms are not carried out in a businesslike way." That much is wrong with the administration of the act is emphasized in the assertion that "the required valuations have not been made because of the fore-

gone conclusion that a large number of deficiencies would be brought to light." The question is asked whether "it is to prevent a rude awakening to the nation that the valuations have been postponed," and in conclusion it is well said that "the state subsidies are provided from taxes and taxpayers have a right to know that their money is being spent economically and to the best advantage; while the prevention and cure of sickness among the insured population should be reflected in better conditions of life even among those who are not insured."

In its final analysis compulsory health insurance is primarily a question of taxation. Twenty per cent. of the cost is to be paid out of general revenues for the specific benefit of a selected group. Dr. I. M. Rubinow and others habitually refer to this group as the "working class." In a free democracy class distinctions are contrary to the fundamental principles of a republican form of government. The twenty per cent. contribution is merely poor relief under another name. It is indirect taxation in its most pernicious form. Forty per cent. of the cost is to be paid by industry, although no evidence has been forthcoming that industrial conditions are to anything like this degree responsible for the amount of ill health prevailing among American wage-earners at the present time. In so far as occupational or industrial diseases prevail in any particular group of employments the burden of compensation should rest in its entirety upon that industry and not upon either the wage-workers or the public at large. There is no evidence, however, that American industry is in any measurable degree responsible for general ill health, and the proof is fairly conclusive that occupational diseases are much less common in this country than in Europe, regardless of the establishment of compulsory health insurance. For these and many other reasons the contemplated legislation on compulsory health insurance should be consistently opposed as contrary to the fundamental principles of a republican form of government and as inimical to the best interests of American wage-workers and the public at large.

## LIFE INSURANCE AS A BASIS OF SOCIAL ECONOMY

By HALEY FISKE

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WHILE the topic assigned to me is "Life Insurance, its Social and Economic Basis," I have reason to believe that what the chairman had in mind was to have some observations made upon life insurance as the basis of social economy. This is a very interesting subject, and life insurance is not looked upon as often as it deserves from this point of view. Very few recognize how intimately life insurance enters

into the domestic life of the people nor the extent to which it has developed and built up the country, and now sustains the machinery of civilized life.

Consider first how widespread in the commonwealth is the insurance of lives. At the end of 1915 there were 43,133,415 policies in force in the United States and Canada, as compared with a population of, say, 110,000,000. We estimate that these forty-three millions of policies were upon twenty-five to thirty millions of lives, and therefore that about a quarter of the population is insured. These are the figures of 244 regular reserve companies. The insurance in force was $23,756,472,828. The companies are exceedingly active and energetic in prosecuting the business. There was a gain of nearly two and three quarters millions in number and nearly one and a half billions of dollars in amount of insurance in force during the year 1915. To realize the significance of these figures, consider, next, what life insurance is. Fundamentally it is the association of numbers of people who realize that while nothing is more certain than death, nothing is more uncertain for each healthy individual than the date of death; that death is a pecuniary loss to the dependents; that there is a necessity to tide over a period during which new adjustments can be made in the lives of the survivors; that for this period assistance is needed. The contributions of these numbers of people go into a fund out of which this help is furnished. Though the date of the individual death is uncertain, the number of deaths in the year among the contributors is quite certain. There is therefore a mathematical relation established between the amount agreed to be contributed and the amount of the fund to be drawn upon death. The uncertainty of the date of death makes life insurance a very human thing. It used to be called a gamble. Surely it is not that. We have a right, after all these years and the tremendous extent of life insurance, to say that the system is the result of conscious mutual helpfulness. It is a social institution. The family which draws a death benefit after a single premium is not drawing charity. The obligation of the holder of the policy was undertaken in good faith with the view of helping others, and the help from others arising from the unexpected death is the mere fulfilment of an obligation which was reciprocal. No doubt when a man insures his life he does it to protect his family in the event of his death; but he neither expects nor desires his own death, and has he not at least a subconsciousness that he is making a mutual bargain to give or take help as the event may prove? Thirty-five out of the forty millions of policies are held in mutual companies. There is something very impressive from the point of view of social economy in the banding together of these millions of people for mutual protection; something very impressive when you think of their yearly mutual contribution of nearly a billion

of dollars, seventy-five per cent. of which immediately passes into circulation, and twenty-five per cent. of which goes into circulation through interest-bearing investments. Life insurance is therefore a brotherhood whose operations are intensely practical. These companies distributed during 1915, $580,121,669—over one half of the national debt. Think of the excitement the government would arouse if it undertook to pay its debt in a single year! Think of the taxation necessary to enable the government to do such a thing! Yet the distribution by life companies of over half a billion dollars in a year causes no comment. It enters into the common life of the people, affecting enormous numbers of them. We may take it that this money went to the families of nearly a million persons, and therefore affected four or five millions of individuals. And this is an *annual* experience. Multiply it by ten years, and consider what a common daily experience is the knowledge by our people of the results of this system of association for mutual help.

It would be mere commonplace to dwell upon the good done by this enormous distribution of money, in relieving want, paying debts, furnishing future support.

Let us go back to the fund out of which these payments are made. It is stupendous in amount. The assets of these companies at the end of 1915 were $5,485,307,895. They increased during the year $257,176,467. There were poured into this fund during the year $1,102,782,532, of which $823,106,490 were from premiums. Of the total assets there were permanently invested in reserve required by law to meet policy obligations the sum of $4,592,921,199; the increase in the reserve during the year 1915 was $251,232,545. These figures are so large as to benumb us if we look at them as mere accumulations. We must consider how intimately into the daily life of our people these millions and millions of dollars enter. In no other way may we appreciate the extent of the service performed.

Take the five and a half billions of assets. It is probable that thirty per cent. of these are invested in railway securities, that is, over one and a half billions of dollars are in the real and personal property of railways. The first thought about this is that the insurance business has been the most important single instrumentality in developing the country; that millions of acres of land have been thrown open to cultivation; that has brought in population for agricultural work; these must be housed, fed and clothed; the crops must be shipped away; then we see towns grow about the stations to forward the freight and to sell the food and clothing to the farmers' families and the railway men. Mills follow to bring manufactured articles nearer to the consumers. Thus gradually cities grow up, all business increases, more money circulates. In short, the crops, the coal, the ores have been wealth added to the country's resources; enormous populations have been scattered over the various

states; the resulting commerce has founded and built up the cities of the country; and through exports, money has been drawn from all the world and millions of people invited to our shores and sent throughout the land.

It is probable that thirty-five per cent. of these assets are loaned on bonds and mortgages. That means that communities have been built up by insurance funds. It is estimated that ten per cent. of the funds are invested in state, county and municipal bonds and bonds of public improvements. That means that communities have been developed and sustained, and have been furnished with the conveniences of modern life and with material facilities for the education of children by the insurance companies. This constructive work is continuous. Under the reserve system of insurance, more than four fifths of the assets are subject to reserve liabilities—the total reserves of the companies amounted to over four and a half billions of dollars at the end of 1915. The investments are stable. They increase automatically, like the rolling of a snowball. More than three quarters of the semi-annual interest receipts are added to the reserve and in turn invested and held. Moreover, the investments are made where they are most needed. This arises from self interest, because obviously the best rate of interest is obtained, as a rule, where capital is scarcest. Fourteen companies have nearly a billion of dollars invested in the west and south.

Probably fifteen per cent. of the assets of the companies are invested in policy loans. Leaving aside the question whether it is wise for either the company or the borrowing policyholders that there should be so much lending, it must be admitted that the loans associate company and policyholder closer together; that the return of over eight hundred millions of dollars collected in premiums to those who paid them, and while they are continuing their policies, means an increase in capital resources; that the business and social life of the individual are profoundly affected. He *spends* the money borrowed. If he pays future premiums with it, he keeps his family protected; if he pays debts, he releases capital and carries easier the burden of life; if he buys luxuries, he thanks insurance for his keener enjoyment; if he tides over loss of income, he realizes as never before the blessings of life insurance.

Let us go deeper into the relation of insurance to the industrial life of the people. The income in 1915 of the 244 companies was over a billion of dollars, of which over 800 millions were in premiums. Of this billion dollars of income ($1,102,782,532), twenty-five per cent. was added to reserve—$251,232,545—and invested in the upbuilding of our material resources; fifty per cent.—$580,121,669—was returned to policyholders new and old. Want relieved, families supported, children educated, debts paid, investments made for widow and children—the blessings of life insurance have so often been explained that I need not

pursue that topic; sixteen per cent. went to management expenses—salaries, wages, commissions—touching the community on all sides as money spent in small sums inevitably does; about one and a half per cent.—say, sixteen millions of dollars—paid in taxes on premiums, an amount we may say unjustly assessed upon thrift, but which went to lighten the burdens of other taxation and contributed to the carrying on of civilized life, protection of property, education, caring for the sick.

Perhaps one gets a clearer conception of the economic service of life insurance when he studies the business of industrial life insurance. Three quarters of all the policies in force are industrial—thirty-two millions out of forty-three. When one thinks of the service performed, the number of individuals affected is perhaps more important than the amount. Is it not a startling fact that one out of every five of the population of the United States and Canada holds an industrial life insurance policy and weekly pays his premium to a collector? Can any one institution be said to be as close to the people as that? When you consider that in Philadelphia and some other cities there are more industrial life insurance policies in force than the number of the population, you begin to get an inkling of how close to the life of the people life insurance is.

One hundred and fifty-six millions are annually collected in weekly installments. This involves eight and a half millions of visits weekly by agents—over four hundred millions of visits annually. The agent performs all the services required by the policyholder—he collects the premiums, pays the dividends and bonuses, calls to prepare the proofs of death and later to pay the claims. The agent enters into the daily family life of the wage-earners. He knows all the family, their joys and griefs, their income and outgo, their pleasures, their work—their very *life;* is often their adviser, confidant and friend; and always in a representative capacity; he is what he is to those millions of people because he to them *is* the company; they know the company is back of the agent; agents may change, but the company is always with them. People pay premiums to the agents and the collections go to the insurance fund—the assets; the assets are invested; part of them go to railway treasuries; part to governmental officials; part to treasurers of public utility companies; part to personal borrowers on mortgages. But these recipients do not keep the money. They spend it in materials and wages. The materials, moreover, had to be manufactured by wage-earners. In the last analysis, the people who pay the premiums get the premiums back in wages. It is the workman who gets metal and coal out of mines, who clears forests, who fashions lumber, who gathers crops, who makes brick, who quarries stone, who draws rails, who casts structural steel, who erects buildings and lays railway lines and builds locomotives and cars. For all these things he gets paid out of the assets of insurance companies

invested in the debts of his employer. And when he gets his wages he buys food and clothing, and this involves more buildings and more railways and more cities and towns and more means of communication and more public utilities. And with part of his wages he buys insurance and pays his premiums and increases the companies' funds. Thus, money he pays to insurance companies comes back to him in wages. An endless chain? No. It is circulating blood. It carries on the life of the people. Service? It is *civilized life!* From the cradle to the grave industrial life insurance is the companion, servant, friend, benefactor of the wage-earning families. It makes of these people a capitalistic class. No one of them can buy a bond, but two hundred of them can do so every year, for their collective industrial premiums will then have amounted to $1,000. A million of them in ten years will contribute enough to build a railway halfway across the continent; or to put up fifty large city schools; or to run a subway through New York; or to supply a large city with water; or to build 20,000 homes for a hundred thousand people—build a city! It is not only that they *can* do it—they *do it!* Consider the assets of the industrial companies—eleven hundred millions of dollars!

A recent progressive stage of life insurance which has economic interest is what is practically the care and investment of savings for the surviving dependents; an end achieved by the deposit of the proceeds of a policy with the company which pays interest, or the payment of the policy in many installments. The amount of insurance on these plans is rapidly increasing. This is a service which saves dependents from errors of judgment and exploitation by unwise and designing advisers.

One large and old life insurance company is issuing millions of insurance to employees covering a burial fund for the employee and weekly support to the dependents; the premiums paid by the employer. Another prominent company issues policies providing sick benefits, accident indemnity and burial fund. These policies may be collective, issued to the employer, with or without contributions from the employee. Two other companies insure their thirty thousand of employees against sickness and death.

One or two companies are offering mortgage loans on homes, with provision for amortization protected by life insurance; a form of service of the greatest benefit to the community as well as to the insured.

The latest development of life insurance in this country is interesting and, to those who know the history of this business, really amazing. It is distinctively American, for it is seen in no other country. It is doubtless the outgrowth of the sentiment which of late years is pervading society throughout the world, and in this country especially has involved industrial and commercial business: the sentiment that there is a responsibility resting upon the prosperous to help the less fortunate; that

there is a duty to the community to better conditions and uplift the mass. As life insurance is based upon mortality, it is a logical working out of this sentiment for the insurance companies to do something to lower the death-rate—to conserve health and lengthen human life. It is the same sentiment which leads manufacturers to improve conditions of labor and domestic life of wage-earners and to promote thrift.

This new service which life insurance has begun runs along several channels, and we may well take a brief survey. In a paper widely distributed at the 15th International Congress on Hygiene and Demography held three years ago, Mr. Cox, manager of the Presidents' Association, composed of about thirty life insurance companies carrying seventy-seven per cent. of the American policies, noted that there was a group of five companies, with twenty-two millions of policies, that were making special efforts to stimulate their policyholders to personal and public hygiene; that there was another group of four companies which advised impaired applicants for insurance as to their physical condition and made suggestions to aid them. Another company provided for free periodical medical examinations of its policyholders. Another had formed a health association among its members. The Presidents' Association itself opened a forum a few years ago for the discussion of things intended to prevent disease; and papers were read by Professor Fisher, of Yale; Dr. Foster, of the St. Paul *Medical Journal*; Dr. Wyman, surgeon-general of the United States Health and Hospital Service; Dr. Rosenau, of the Harvard Medical College; Dr. Porter, health commissioner of New York state; Dr. Doty, health officer of New York City; Dr. Wilbur, of the Census Bureau, and Dr. Dwight, of the New England Mutual Company, on such subjects as the Economic Aspect of Lengthening Human Life, Increased Longevity of Policyholders, Work of the Federal Government in Health Conservation, Preventive Medicine, Fight against Preventable Diseases, Modern Sanitation, etc. The American Life Convention had addresses by experts on Forces against Mortality, Mortality from Diseases of the Kidneys and Circulatory System, the Short Life History.

A Life Extension Bureau has been formed, patronized by several companies, which examines insured persons and communicates the results to the family physicians, the cost defrayed by the companies. One life-insurance company has thus had examined fifteen thousand of its policyholders.

One company with nearly thirteen millions of policies in force has issued large numbers of pamphlets and leaflets on health and disease to its policyholders and has an expert constantly studying morbidity from many points of view, especially occupational diseases, and publishes the results.

Another company, with over sixteen millions of policies, has an

elaborate system of education and of fighting disease and ameliorating sickness. It has circulated one hundred and forty millions of pamphlets, leaflets and magazine articles in several languages upon such subjects as Tuberculosis (six millions), Care of Children (two and a half millions), Teeth, Tonsils and Adenoids (same number), Health of the Worker, Care of Babies (six millions), Milk (five millions), Flies and Filth (six millions), Typhoid Fever, Scarlet Fever, Diphtheria, Measles, Whooping-cough, Cancer, Pellagra, Hookworm, Infantile Paralysis, Smallpox, and has distributed thirty-four millions of paper drinking-cups. It exhibits health educational booths at county fairs, as many as 125 in a year. It assists health officers in clean-up campaigns in over 250 cities. It has made surveys of several large cities to discover and tabulate the amount and causes of sickness. It has helped the authorities to enforce housing laws; distributed ballots on votes for municipal sanatoria and additional school houses; cooperated with anti-tuberculosis societies; agitated in legislatures and among health officers for systematic and accurate vital statistics. It has cooperated with the federal government in a survey of unemployment in 44 cities—a survey covering three millions of lives. Its most remarkable work on lines of health is a system of furnishing free the service of trained nurses among sick policyholders, whose visits number a million a year; the nurses attend the sick and give instruction to the families in hygiene. Over six and a third millions of these visits have been paid. It has entered into a kind of partnership with two states to get trained nursing to every sick inhabitant. The company has built a sanatorium for tuberculous employees and is building a rest house for convalescents from other diseases. The sanatorium is a center of study of the White Plague, its prevention and cure, and carries on correspondence and reciprocal visits with like institutions. Of about 500 treated, including those still in the institution, it has discharged as cured (or arrested and quiescent cases, as physicians say) 35 per cent. in two years' work, although at the start over 8 per cent. of the cases sent were far advanced, 61 per cent. moderately advanced, and many are still under treatment. It is now paying for the work of taking over a whole town, making a survey to determine what inhabitants are infected with tuberculosis, then of isolating the patients, nursing and treating them—in an effort to find out whether such work will result in stamping out tuberculosis altogether from the community. Altogether the company spends more than a million dollars a year in welfare work. The company medically examines its twenty thousand agents and employees annually for the discovery and treatment of incipient disease.

It seems to us that the best thought of the age has fixed upon insurance as the solvent for most of the economic ills of society. One can in imagination picture the time when instead of one in every five, four in

every five of the population shall be insured in mutual companies; and in the development of these companies along welfare lines which is now in its infancy one may look to the time when the people shall take care of themselves through life insurance in a service covering health in life, care in sickness, indemnity in death, sanitation in community life, the financing of home-owning, of public utilities and civic conveniences—a mutual service of cooperation among such a large proportion of the population that it may be called The New Socialism!

## RECENT DEVELOPMENTS IN THE LIFE INSURANCE FIELD

By ROBERT LYNN COX

GENERAL COUNSEL AND MANAGER, ASSOCIATION OF LIFE INSURANCE PRESIDENTS

THE topic assigned to me on this occasion seems to be a call for the latest news of the life-insurance business.

I am asked to play the rôle of reporter.

But what I have to say will not be startling or important enough to cause the Friday papers to issue extra editions or the Saturday weeklies to hold their presses in order to get the story.

Life insurance has passed the experimental stage. Development in that field is no longer classed among discoveries. Progress here is merely growth—steady normal growth. Who can become excited over such a thing as that? Even the chief ailments of this business have run their course or been cured. State supervision provides physical and moral examination of every company at least once a year and official X-rays are used on nearly every important transaction.

Oh! Life insurance, like mankind in general, is pretty well protected now-a-days against germs and accidents.

But, like mankind again, the dangers which threaten are the degenerative diseases. Statutory regulation in too great detail is threatening it with hardening of the arteries, that ailment hitherto confined almost exclusively to governmental functions. Excessive taxation is weakening its heart action.

There appears to be some danger that the public may not awaken to the situation until the patient is beyond help.

We sometimes forget that an institution which has sprung from economic needs and has continued to flourish for years without governmental aid must have in it that which satisfies widespread human desire. And if it has, it is entitled, as an institution, to the kindly consideration of the public at large. If error has crept in, the public interest calls for reformation rather than destruction. One of the chief dangers that

threatens society to-day is the custom of viewing minor social faults with distorted vision. At the very time when we are learning that environment has so much to do with sin and crime, that reform and not punishment must hereafter be the watchword in dealing with *individual* infractions of the law, we forget that environment has likewise been the chief cause of *business* sins and misdeeds and that here too we need reform rather than capital punishment. In the day when so much is being said about the need for conserving our natural resources, may I not suggest the importance of conserving those artificial resources consisting of the business institutions created by man to meet his economic needs?

If we can learn anything from the rapid changes in our economic surroundings, it is that the individual is becoming more dependent upon others whom he does not know personally and less independent in his relation to society as a whole. In other words, he is being submerged in the social organism with little or no chance for independent existence. Though he may struggle to preserve to a degree his individuality, yet in the end his happiness is going to be determined more by the attitude of his fellowmen toward him, than by what he can do for himself alone. This change of economic relationship is finding its manifestation in cooperative movements of all sorts.

Life insurance has an important relation to this changing condition of the individual, which we may as well call progress, since it represents a world-current from which there seems to be no possibility of escape.

In the beginning the economic disturbance caused by the death of a breadwinner fell upon his immediate dependents. But with the knowledge that the death rate was subject to the law of averages, it became possible, through life insurance, for men to largely absorb the economic shock in the individual case and distribute it among the living.

It has shown how men themselves can provide for the helpless and protect the weak without appeal to charity and without reliance upon governmental paternalism. It stands as one of the few living examples of cooperative movements that have succeeded, showing that if organized on business principles and placed under competent management cooperative effort can render the best of public service.

While life insurance is necessarily cooperative in principle, it has been worked out on a business basis, which means that benefits are proportioned in each case to the obligations assumed and borne by the policyholder. As a self-sustaining, independent organization, it could not have lived under any other plan. Each policyholder is given as much as he pays for and no more. Though the institution provides for the needy in its general results, it is business-like and just in apportioning its burdens and making its returns to the insured. This is a natural result of conducting it as a business affair where the doctrine of "money's

worth" must prevail as distinguished from party affairs in which "political worth" is what counts. Incidentally, the success of this institution points the finger of shame at the scandals of mismanagement and corruption in governmental affairs, showing, it would seem, how much greater efficiency and honesty can be expected under a system that is not subjected to the uncertainties and upheavals incident to political office with the scheming that is necessary to secure and retain political position.

From the standpoint of present policyholders, life insurance is cooperation in the matter of adjusting death losses between people of a selected class. It is a grouping for insurance purposes of those who are free from serious physical defects so far as can be ascertained prior to their admission to the groups—of those who are able and willing to pay their respective shares of the expense involved. They expect no favors and will tolerate no discrimination.

Should the time ever come when life insurance is brought under political domination, through undue extension of supervisory power or otherwise, I hope it will not happen until we have achieved such perfection in our governmental organizations as to make certain that vote-getting ability will not be substituted for physical fitness as the test for admission to insured circles. While it may be argued that those who need life insurance most are the lazy, the impecunious and the diseased, yet those who are not thus classified, but are insured under existing conditions, can not fail to see how their burdens would be increased should insurance doors be thrown wide open. If society at large must carry the weak and unfit, as, of course, it must, surely it can be done far more economically through public institutions and other devices of modern civilization planned especially for the purpose, than in an attempt at universal insurance, providing for the payment of money to the improvident *with no check upon the habit of improvidence* which has largely been responsible for their dependent position.

It is well to think of these things in days when so many well-meant, but impractical, insurance schemes are being urged upon the public for immediate adoption.

While the pendulum of human action doubtless must continue to swing from one extreme to another, I would like to remind those who stand with heart alone at one end of the arc, and likewise those who stand with head alone at the other end, that the release of mechanism which takes place at the point midway between the two is what makes for real progress. For this reason my plea is not for brain only, such as developed to a marvelous degree the business activities which characterize the last half century of our civilization, nor for sentiment alone, which to-day seems to dominate our thinking in regard to what should be done to remedy existing defects in our social organism, but rather for

a combination of the two, *in* which alliance I believe it will be found possible to retain our business efficiency which has become the marvel of the age, and yet have it used in the interests of humanity as a whole.

Life insurance stands to-day at the head of institutions making their appeal to manhood and independence, by offering a practical method of escape from the economic catastrophe which threatens every bread-winner in greater or less degree. It may, therefore, be said to be an institution of progress thoroughly in accord with present-day desires to take the load from shoulders unduly burdened and put it upon those who can better afford to carry it. It was organized to do just that and it is doing it.

I know there are some who do not regard this institution as being at the forefront of the world's progress because it is not of recent origin. To them I would suggest that old things are not necessarily reactionary (whatever that means), though frequently characterized as such. The farmer who raises wheat is not reactionary because he is doing that which was done by his ancestors before him; likewise, he who manufactures clothing is not reactionary simply because he is doing that which has been the business of some one since the race began. Both are contributing to the world's progress, though following in well-beaten paths. Likewise, life insurance is marching with society, using the lamp of experience to light the way ahead. We must discriminate between enterprises and institutions on some other ground than age and size, though there is a tendency nowadays to decry everything that is large and most of that which is old.

The great and important work done by life insurance is, and must always be, that of alleviating the distress and absorbing the shock caused by the death of a wealth-producing member of society charged with responsibilities of caring for others. And as we come to see more clearly that all such disturbances are matters of public concern, we will the better understand why life insurance has led and will continue to lead as an important factor in economic affairs.

Life insurance under alert and active leadership has always proved itself ready to enter new fields and to serve new needs. Under partnership insurance each partner is insured against the death of the other in order that the business established and successfully carried on by their combined talents shall not be financially crippled and perhaps destroyed by an unexpected and unpreventable dissolution of the firm. Very similar in usefulness and effect is what is called corporation insurance, under which great business institutions are protected financially against the disturbance that would necessarily follow the untimely death of the managing genius of the institution. So too, banks, and other lenders of money who are accustomed to look for security more to the personal character and reputation of the borrower than to the property he may

own, are asking for insurance upon his life as protection against the only contingency they fear and the only uncertainty they need to provide against. These are comparatively new fields for life insurance activities, showing that as a new need is developed the men in the business prove themselves ready to meet it.

Again, we see it coming forth with protection against great evils as they developed from time to time. We have all read recent reports of the federal prosecution of gigantic fraudulent investment schemes under which millions of dollars have been filched from small investors of limited experience. The most fertile field of operation for such swindlers is among those who have suddenly come into possession of legacies or perchance of insurance funds. Life insurance companies can not protect any except its policyholders, but this it began doing long in advance of the recent disclosures to which I have referred, by providing a policy which would pay a fixed monthly, quarterly or annual income to the beneficiary instead of paying a lump sum that would impose on the recipient the burden of investing it safely and satisfactorily. I do not need to explain further in this connection to show you how here again this great institution has been keeping up with the needs of the times and is making itself a factor in the world's progress.

The adaptability of the modern life-insurance policy to present and prospective needs of the insured, whether certain or contingent, is a matter of amazement to those who are unfamiliar with the subject. While the company is bound hard and fast to its contract, the policyholder can continue it as long as he likes and if he decides to withdraw can take out whatever surplus fund remains to his credit, or, if he prefers, take his money's worth in paid-up insurance. The company's only hold upon him is the retention of his confidence through fair dealing and just treatment. Is it not marvelous that under such a situation, taken in connection with the modern tendency to unduly magnify evils and weakness, that the business has not only held its own, but continued to flourish to a greater degree than other large business institutions?

We are learning that life insurance can render many incidental benefits. Perhaps the latest to attract attention is that of its service to the cause of public health, or as translated into life-insurance terms, the prolongation of human life.

In the earlier days of the business it was thought that to apply the law of averages and to compute and collect premiums high enough to provide for payment of death claims was all that life-insurance companies should be expected to concern themselves with. But now men engaged in this business conceive it to be a duty to devote and find pleasure in devoting a part of their time and energy to the campaign having for its purpose the prevention of preventable diseases. The connection of life

insurance with this movement might be compared with the transportation of goods and passengers over country roads. At first attention was devoted to constructing springs that would absorb the unevenness of the highway. But now we are coming to understand that it is cheaper and better to remove the stones and fill the ruts in order that springs may be needed less frequently. In other words, instead of devoting our energies wholly to the perfection of devices intended to absorb the shocks, we are now thinking more of removing or preventing the things which cause the shocks. This is a homely comparison, but illustrates fairly well why life-insurance companies and others are now taking part in the various campaigns having for their purpose the prevention of disease and needless death.

I will not take the time to rehearse in detail how much is being done by life insurance companies along this line. I must be satisfied in stating to you that nearly every large company in the United States is doing something intended either to prolong the lives of its policyholders or of the people generally.

Assuming, as I think we must, that advancement in the welfare of society as a whole is the test of what shall be deemed progress in the world, can there be a doubt that life insurance is to-day playing a leading part in it? And though we put aside the main contribution, it has made toward the lessening of human misery, do we not see that even in its secondary functions, to some of which I have briefly referred, it is doing much to solve the newer questions of the day, questions that will increase in importance as population multiplies and society becomes more complex? As the public becomes interested to a greater degree in cooperative efforts and in a wider measure of unselfish devotion, is it likely to find another institution affording better evidence of what can be accomplished in this direction or which could as well serve as a model for others to follow?

To me the hope of the future lies in the fact that religion and ethics and business are no longer being carried in separate airtight compartments of the human mind, but are freely intermingling to the great improvement of each. The need for the observance of moral principles throughout seven days a week, instead of confining it to the doings of one day, has become a popular doctrine and is generally commended. Now we seem to be reaping the natural harvest of having business take up for solution the economic problems involving ethical principles. This means that business, with its habit of getting results, with its wealth of training and experience, with its eye for the practical, has been enlisted in a new cause. As I see it, business with broader motives and higher ideals is likely to become the most potent factor in bringing about the reforms that are needed to make this world a fit habitation for our brothers of to-day and for the generations that are to follow them.

So, I say, let us not destroy the business agencies now serving our social needs nor sacrifice wholly the efficiency they have developed under the impelling human desire for personal gain. Let us, instead, continue the movement, already well under way, of putting into our business activities the spirit which makes personal gain an incident and service the real motive. Such a result has largely been accomplished in the life-insurance field and is the most important of its many recent developments.

## LIFE INSURANCE AND LIFE CONSERVATION

By EUGENE LYMAN FISK, M.D.

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WHICH is the greater public service for a life-insurance company to perform: to pay a $10,000 claim to a widow and children, or to keep alive a $100,000 husband and father? This is putting the question in a crudely materialistic way that invites an answer in dollars and cents, an all too common quantitative American method of valuation. Yet it is by such concrete mathematical expressions of the financial value of a man that we can most successfully arrest attention and focus it on the appalling waste of human life.

It would be difficult, indeed, to exaggerate the opportunity and obligation of life insurance as an institution for the prevention of poverty, as a conservative mechanism for maintaining the stability of the family and enabling those of moderate means to acquire an estate at the expense of a small annual outlay, but as we felicitate ourselves on the economic value of the life-insurance policy at a time of bereavement, on its wonderful power to meet the trying emergency created by the loss of the breadwinner, let us halt for a moment and ask the question: Was the loss, which no money payment can really make good, an inevitable loss? Was it due to some fault in our social organization that permitted a life to pass over the precipice without a warning? Did the great institution of life insurance neglect any opportunity to set up a warning, to furnish life-guidance that would have turned the policyholder away from the precipice? Has it done all its duty and fully utilized the machinery at its disposal by providing an ambulance and a splendid funeral at the bottom of the cliff over which the policyholder plunged unwarned?

The answer may be that the purpose of life insurance is to insure, not save, lives; that society provides other agencies for such purposes.

To that it may be replied that this is an age when opportunity for public service is held to impose an obligation for its performance, when

the scientific organization of business activities demands that there shall be no lost motion, no wasted by-product.

There is now held by the old-line life-insurance companies of this country about $5,000,000,000 of assets for the protection of more than 40,000,000 policies.

This immense business mechanism, in periodic contact with practically the whole wage-earning population, enjoys unusual opportunity for reaching the mass of the people with the message of personal and community hygiene, of how to live so that life shall be most worth living and not prematurely snuffed out.

To put behind health conservation and health improvement work the right kind of effort, we must commence with the acceptance of certain premises and fix certain ideals as to ultimate accomplishment. The physical changes usually ascribed to time we must recognize as due to poison or infection or starvation or trauma or emotional strain, all factors to some degree under the control of man. We must look upon old age and death as provoked phenomena.

It is not time that we have to defeat in seeking to prolong human life, but activities that adversely affect our tissues in the course of time. Time itself is a mathematical abstraction; it does not govern the death-rate, and death-rates are not fixed by any immutable law, even that of heredity. There is no effect without a cause; and whatever factor there may be aside from those I have enumerated that is responsible for old age and death, it will be found to be a material cause subject to some form of modification or control.

Medicine is beginning to emancipate itself from the thraldom of terminology as applied to disease. The conception of disease as an entity, as a progressive process to which a man is condemned in some mysterious way, is still in some degree exerting its influence over the attitude of medical science toward the human body; but as one "disease" after another is shown to be the result of an infection or starvation (food deficiency) or emotional excess, or a poison from within or without, we come to view "diseases" merely as tissue changes or persistent functional disturbances due to the operation of these definite influences, and we appreciate that if the body is protected from these very definite antagonistic influences the so-called disease disappears, except so far as it has resulted in permanent impairment of tissues. So that a man who is either ill or growing old is merely one whose cells and organs are breaking down or disturbed in their relationships by factors to some degree under the control of science.

To what extent the complete revelation of bodily defects and their causes and the complete utilization of present scientific knowledge for the correction of bodily defects and of faulty bodily care may lengthen human life, is a matter that affords abundant exercise for the scientific

imagination. At least a long step will have been taken toward improved conditions when the postulate is accepted that the death-rate is not subject to rigid law, but to controllable conditions, when it is universally conceded that the field is open and that it is not limited either by the Psalmist's threescore years and ten or the American Experience Table, or any other formula merely derived from experience under conditions that are neither fixed nor necessary.

### Three Years' Progress

At the meeting of this section in 1913, it was my privilege to read a paper on this subject, in which the possible functions of the life-insurance company in conserving the health of the people were outlined and the already existing activities were described. Since then there has been a strong growth of sentiment in favor of conservation work by the life companies and a very considerable extension of these activities, foreshadowing an ultimate complete utilization of the available facilities for prolonging and improving human life. Much, however, remains to be done and there is an immense field yet uncultivated, as the following analysis of the health conservation work now being done by the old-line companies will show.

In response to a questionnaire set to all old-line companies in the United States and Canada, I find the following conditions:

Two hundred and thirty-one insurance companies were circularized, of which number 119 responded, as follows:

| | Ordinary | Industrial | |
|---|---|---|---|
| 48 companies with .. | 3,869,789 | 597,536 | policies are doing nothing |
| 32 companies with .. | 621,114 | | policies are doing nothing but are favorable to plan and contemplating action |
| 12 companies with .. | 640,190 | 2,559,581 | policies are occasionally sending out health literature only |
| 3 companies with .. | 152,391 | | policies are regularly sending out health literature only |
| 23 companies with .. | 4,293,132 | 27,316,532 | policies are giving some form of periodic health examinations to some of their policyholders |
| 1 company with ... | 21,991 | | policies are sending out periodic health bulletins and giving periodic examinations to all policyholders, as a policy provision |
| Total 119 cos. with.. | 9,598,607 | 30,473,649 | policies |

112 companies have not as yet been heard from.

In January, 1914, the Life Extension Institute was organized for the purpose of developing a specialized organism for carrying on work

of this description, on the basis of a self-sustaining public service institution, with a board of 100 advisers, among the world's leading scientists, that would safeguard its educational and scientific policy.

The institute aims to collect data regarding personal hygiene and to encourage a proper application of such knowledge by providing a periodic examining service, so that the particular needs of the individual may be ascertained and the rules of hygiene be applied with precision.

The Metropolitan Life Insurance Company, the Germania Life Insurance Company, the Connecticut General, the Postal Life Insurance Company, and the Aetna Life Insurance Company have extended the benefits of the service to a considerable body of policyholders.

Among other leading companies that are moving in this matter may be mentioned the Equitable Life, which has within the last two years, in addition to issuing health bulletins to policyholders, extended the privilege of a periodic health examination to policyholders in the larger centers, and a urinary analysis to others.

The Penn Mutual is experimenting along similar lines in Philadelphia and is planning an extension of the work. The Prudential has issued some health literature, besides making many contributions through its statistical department to the study of mortality conditions, and has lately extended to a large body of its policyholders the privilege of sending urinary specimens to the home office laboratory for examination, in order to determine the early signs of kidney trouble.

The Metropolitan Life has engaged in the most extensive and diversified health activities among its policyholders, involving a vast expenditure for their benefit. These include a nursing service for industrial policyholders, the distribution of many pamphlets on personal and community hygiene, for its policyholders and for general circulation, many contributions to statistical and social science by its scientific departments, the service of the Life Extension Institute for ordinary policyholders, and lately the contribution of $100,000 for a community experiment, in cooperation with the National Association for the Study and Prevention of Tuberculosis, for studying the prevention of tuberculosis and the conservation of health generally by means of thorough individual examinations, laboratory work, etc., in a particular community, which shall later serve as a unit expression or exhibit of methods that could be applied throughout the country. Also, the company maintains one the finest sanatoria in the world for the treatment of tuberculosis among its employees.

The amount of good done by such agencies can not be represented solely by the direct influence on those who have been served. The universal stimulus given to health conservation work by the Metropolitan's activities probably exceeds in value the direct benefits conveyed to its policyholders. The utilization of these opportunities for enlightening

the public on the laws of hygiene has been shown to be in accord with a practical and feasible, humane and sound business policy, which has been put into effect without any embarrassment or disturbance of the regular function of life insurance and with undoubted immense benefit to policyholders and to the public.

In my former paper before this section I referred to the three years' experience of the Postal Life on a group of policyholders who had taken these periodic examinations and the apparent saving of life that had been effected among them. It was estimated by their actuaries that for every dollar of expenditure there had been a reduction of mortality representing a saving of $13.00. This experience is now of about seven years' duration, and a recent analysis shows that these favorable mortality conditions still continue, so that the former figures can not be regarded as a fortuitous fluctuation.

A seven years' exposure of $11,000,000 of insurance, average age 51, and 40 per cent. of the risks found impaired to the extent of being substandard, showed a mortality of 80 per cent. of the American table. These were mostly old risks, long insured, taken over from the Provident Savings Life. The general mortality of the Postal has shown peculiarly favorable mortality movements which are ascribed by the management to the general health propaganda. In this company all policyholders are entitled to the privilege of yearly health examinations as a provision of their policy contract, and all receive the health bulletins issued at intervals throughout the year. Many that do not take the examination are undoubtedly influenced to go to their own physicians and otherwise benefit by the suggestions received. The mortality of the Postal Company, apart from its reinsured risks, in the tenth year of its existence is 29 per cent. of the American table.

The Germania Life Insurance Company has published the following figures and comments regarding the examination of its policyholders by the Life Extension Institute:

**A study of a group of examinations of Germania policyholders completed during 1915 by the Life Extension Institute brings out some striking facts.**

**Only 1.21 per cent. passed a perfect examination, that is, no physical impairments were found and no advice for correction of living habits was needed.**

**The individuals found imperfect, either in physical condition or manner of living, were graded as follows:**

| | Per Cent. |
|---|---|
| Seriously affected | 4.25 |
| Moderately affected | 64.12 |
| Slightly affected | 30.42 |
| Total | 98.79 |

**Of those referred to physicians (68.37 per cent.), 20.27 per cent. were aware of impairment.**

**The inference seems justified that from the standpoint of physical well-being the lives of these policyholders were made more livable and that Health Service lengthens the lives of policyholders.**

**(These figures may be taken as closely approximating the results found in other large groups examined by the Institute, and fairly exhibit the average conditions that offer opportunity for conservation measures.)**

These figures differ in degree from those exhibited in my paper before the section in 1913. The group then reported on showed only 40 per cent. of impaired lives, and among them 44 per cent. were unaware of impairments. The much higher proportion of impairments found by the institute, and the larger percentage of those unaware of such impairments, simply reflect the development of a much more extensive and highly standardized system and a continually improving technique among the examiners.

Having secured the cooperation of the examiners throughout the country, the institute has called upon them for a critical and thorough survey of the body and has appealed for a standardization of system and technique which has met with a very gratifying response.

If the comparatively crude and tentative methods followed with the first group of policyholders ever subjected to such a system has resulted in so emphatic a saving of life, what may be expected from a far more rigorous and searching examining system, coupled with a more careful review of the living habits of the policyholder, a full report to him and to his physician, and an extensive educational service provided by special leaflets dealing with the policyholder's personal needs?

Many individual instances of health improved and lives saved by this system are on record, but a statistical statement of the results yet remains to be made and involves many difficulties because of the critical analysis to which these lives have been subjected and the difficulty of classifying them in the light of the new knowledge developed by this work and by the more exact technique employed. As a three years' period will soon be completed, we hope, with the cooperation of the companies having contact with the institute, to work out the problem and secure a preliminary statement of the influence of this system.

Incidentally, the Life Extension Institute is laying under a heavy obligation even those insurance companies which do not take its service, in that in our examination of commercial and industrial groups we are continually discovering impairments among thousands of life-insurance policyholders and assisting such policyholders to prolong their lives.

### Urgent Need for Conservation Work

One significant fact, however, awaits no further demonstration; namely, the widespread need for such work, not only by life insurance companies, but by all agencies through which the people can be reached,

and possibly in the final analysis by the government itself. There is no need to wait for government action. Certain economic principles involved make it possible for this tremendous influence for national preparedness to be put in motion as a sound and saving business policy for every one who practises it. The insurance company strengthens its policyholding body, its greatest asset, and reduces its mortality rate, its greatest liability. The manufacturer keeps more closely in touch with his operating force and increases its efficiency and its stability. The individual who himself elects to pay for such a service protects himself from the financial disaster of illness and of physical inefficiency, and really takes out *life* insurance as distinguished from "death" insurance. The employer and employee meet on a common ground of mutual interest, just as the insurance company and the policyholder join in mutual protection by following these life-lengthening methods.

Government investigation covering one million workers shows an annual average loss for the whole country of about 270 million days on account of illness. This does not by any means reveal the degree of physical impairment. There are millions of people who do not lose a day's work on account of illness, but who work year after year physically below par—billions of days of inefficient or sub-standard work that have never been counted.

The opportunity, the need, require no further demonstration. For a mathematical expression of results we must await further accumulation of data, but that is no reason why the work should be neglected and precious time wasted. There are so many things that can easily be done, even though the complete health service advocated by the institute is not considered feasible. The constant reminder to policyholders that a yearly examination and a consideration of their personal hygiene would be greatly to their personal interest, to the interest of their families, their business and their country, would help to gain recognition for this principle and stimulate many to follow it.

The National Association for the Study and Prevention of Tuberculosis has joined with the institute in urging upon the public through various channels—health departments, medical societies and others—that December 6 be fixed as Medical Examination Day, when all people, especially those believing themselves in good health, will either be examined or definitely arrange to be examined; in other words, take themselves to a "service station," whether family doctor or life insurance company or Life Extension Institute, and be thoroughly overhauled and started right for the coming year, repeating this yearly.

Can any one doubt the tremendous influence on national vitality, on physical preparedness for war or peace, of so general a practise? It is, of course, of immense importance that the work be standardized and that the public be educated in personal hygiene in addition to

securing such actual medical treatment as may be required at the hands of family physicians or specialists, and hence the need for specialization and organization in assembling available scientific knowledge and delivering it to the people.

### Standardization of Method and Technique

Physical examinations are now being made for many purposes, for insurance, for employment, for military and athletic purposes, and in connection with school inspections. There is no reason why all such examinations should not be conducted along standardized lines, regardless of the object of the examination. If conducted and controlled by scientific men, they owe an obligation to science to make the results available in complete form for scientific study; and especially in connection with such a public service institution as life insurance, it seems incumbent as a public responsibility to make such examinations the instrument of scientific research as well as of mere business routine.

The examinations for life insurance as now conducted simply fulfil their primary object of keeping the mortality of the companies well within the American Experience Table; but if a larger and broader function can be exercised, which carries a benefit to the policyholder, reduces the mortality of the company without denying the benefits of standard insurance to any larger number of individuals, puts in motion a powerful force for social betterment, for improving the stamina of the race and insuring the dominance of our civilization, while furnishing almost priceless information to science, we may well ask, why hesitate? Why give the glory of the work to the next generation?

This brings me to the consideration of a new plan by which the insurance companies can utilize a by-product now going to waste, a plan that is free from any of the alleged objections that have restrained many companies from giving their policyholders the periodic health survey.

Nearly five millions of dollars are now annually expended among about 80,000 medical examiners for the purpose of ascertaining the physical condition of about 1,000,000 applicants for insurance. This work, as I have stated, is directed solely with a view to the business end of separating the insurable from the uninsurable.

It needs but a moment's clear thought, however, to grasp the fact that this vast machinery can be used for life-saving purposes, with little added expense, and that those who enter a life-insurance company may be the recipients of a large degree of personal protection as well as securing protection for their families after they are dead.

### Real Life Insurance for Entering Policyholders

Our new plan involves a review of the application and medical papers for the purpose of preparing a message of guidance to the entering

policyholder, so that he may know exactly his condition as a risk and what he can do to improve it.

Even life-insurance experts are accustomed loosely to separate risks into two classes, standard and sub-standard. But we must admit upon reflection that these so-called standard risks vary within wide limits, not only individually but as to groups and types. Assuming the general mortality of a company to be 100, risks are accepted as standard whose condition warrants their classification in groups ranging from 50 per cent. of this table to 185 per cent., the average of 100 being made by the variation between these extremes.

This is no mere hypothesis. The recent medico-actuarial investigation showed that risks of certain classes, those indulging regularly, but in so-called moderation, in alcohol, for example, as well as overweights, have shown a mortality reaching up to 185, the most temperate individuals, of course, carrying their more self-indulgent fellows.

Now, companies try to exclude those whose mortality will probably exceed 125 per cent. of their table, but there are yearly accepted thousands of people who are far below their maximum possible condition of health, people who are in a high mortality class, or at least in a borderline class.

We contend that they are entitled to know this, to receive a message from their company, warning them of the trend of the mortality of their class and pointing the way to neutralizing it. Family history, overweight, lightweight, poor development, constipation, eye-strain, personal history of various disabilities and disease, none of which disqualify for life insurance, but all of which warrant some guidance as to how to live and often even as to medical treatment, point the way to a tremendous public service that can be performed by a business that is so interwoven with our social fabric that it has ceased to be a mere commercial organism.

I believe it to be a fact that the issuance of a life insurance policy has put the seal on many a man's physical failure. It is not only those who become ill and die who physically fail, but those who go on year after year, working below par, failing of achievement, failing to do their best work because of physical handicaps, often developed and confirmed by faulty living habits or bodily neglect.

### False Sense of Security Engendered by a Life Policy

Such men, receiving an insurance policy, slap themselves on the chest and say, "I am all right; I guess I can stand another twenty years of high living," and, feeling that their families are protected if they should happen to make a mistake, they are confirmed in their *laissez faire* philosophy. To tell such men that they are 50 points distant from the well set-up, careful, temperate liver will perhaps rouse

latent common sense and manhood power to assert itself, and totally change the physical and mental type.

We are so wedded to evolutionary theories that we fail to recognize the extreme plasticity of the human mind and body and its susceptibility to modification by training and environment. There are sources of mental and physical power that too often go untapped. I have seen a tub of a man almost transformed into a greyhound type, keen and alert instead of heavy-footed and sluggish.

This service to entering policyholders can be based even upon existing medical reports, but it could, of course, be greatly increased in value by modifying the present form to include more thorough inquiry into living habits and a more thorough and complete report on bodily condition. This need not involve a more rigid system of selection, but would certainly bring about a more exact method of selection in the light of more complete knowledge of the condition of risks.

In furtherance of these ideas, the institute has formulated the plan for such a service, to include the mailing to the policyholder of the monthly Health Letters of the Institute, a review of the papers and a message to be prepared by the institute, and the policyholder to be urged to adopt the system of yearly examination.

Two companies already taking the periodic service, the Germania Life of New York and the Postal Life of New York, have subscribed for this service, and others are giving serious consideration to it.

### Wide-spread Impairment among Our People

Wherever these physical examinations are made, they reveal a condition of practically universal impairment, not only with regard to minor impairments to which all civilized men and women are subject, but they show a certain degree of damage to the body from various causes which should be a matter of grave concern to those who are considering the available resources of our population to defend the liberties of our country or properly to utilize them in developing a civilization that shall endure and that shall be characterized by an improvement rather than a deterioration in the average physical, mental and moral type.

Studies of the trend of mortality in this country are not reassuring, and the recent results of the examination of recruits, long since foreshadowed by the quality of the material presented to the government in former years, only confirm what is found in the examinations of the institute, a sub-standard condition of physical insufficiency, characterized by manifold forms of defect, especially unsuspected chronic infection, mostly foci in the head, such as mouth and tonsillar infection, which make for organic disease and premature senility.

The increase in these organic affections and the apparent increased death-rate at the later age periods in this country have been repeatedly

ascribed to the saving of young life from communicable disease. Such a factor has not yet had time to exert such an influence, although it may well do so in the future and is an added reason for putting in motion neutralizing influences.

It should be remembered, however, that in Sweden and in England and Wales, where there has been a similar saving of young lives in the last thirty years, the death-rate at every age period has been lowered and the expectation of life at every age period has been increased.

### Fundamental Basis of Preparedness

No campaign for preparedness will be complete that does not plan for a thorough periodic physical survey of the whole population and an intelligent application of scientific measures to the correction of physical defects and faulty living habits, as well as a further study of the factors that make for degeneration and the possible ways for neutralizing them.

The opportunity open to life-insurance companies to cooperate in the work of building up national vitality may be summarized as follows:

1. Educational work among policyholders by means of health bulletins.

2. Direct intensive work among policyholders by means of periodic health surveys solely for the purpose of prolonging life.

3. Reports and advice to entering policyholders with regard to their condition as risks and the ways by which they could become better risks.

4. Cooperation with health departments and health agencies to secure better health legislation.

5. Standardization of method and technique in the system of medical examinations, in order that the results may be of greater value to science in the study of human defects and the influence of living habits.

6. The stimulation among medical men throughout the country of a close study of diagnostic technique in the detection of early signs of bodily impairment and the personal hygiene appropriate to combat such tendencies.

Practically all of these things are now being done to some degree, but there is need for more concerted action for a complete utilization of these facilities instead of a partial and experimental use.

### General Conclusions

During the last fifty years there has been a rapid accumulation of scientific knowledge, and so marvelous an adaptation of that knowledge to the modification and development of civilization so far as it relates to the complexities of living and of social and industrial organization, that we have been lulled into a sense of self-confidence and security as regards our racial progress. It is too frequently assumed that this mere accumulation of knowledge and of the conveniences and ingenious devices of civilization reflects an actual improvement in the racial type.

I do not think we have any evidence that man as an organism, whether in regard to his physical or mental capacities, now presents a higher average type than characterized the nations of antiquity. Indeed, so far as his physical structure is concerned, there is much evidence to the contrary, and I think we may be assured that the great minds of antiquity would have made equally good use of present-day knowledge if they were with us to-day and in a position to utilize it.

Before the advent of the recent war, foreign countries, as I have stated, showed a decided improvement in vitality at every age period of life, offering some encouragement to the belief that, notwithstanding the tendency of complex civilization to place the organism out of adjustment with natural conditions, there were, nevertheless, balancing factors determining an advancing rather than a receding tendency with regard to physical stamina and adjustment to the changed conditions of civilized life.

What effect the great war will have upon those countries that have been depleted of their best types remains to be seen. Grave concern is surely justified as to the outcome.

I have referred to the mortality trend in our own country and its rather sinister significance. Whatever may be the factors at work, whether over-dentistried teeth, admixture of foreign blood, or the strain of a remarkable industrial expansion with its disturbance of social equilibrium, surely there can be no question with regard to the urgent need for completely determining the condition of our population and putting into motion such agencies as we can command favorably to govern the physical trend of the race.

It is true that the possible ultimate influence of saving the unfit must be reckoned with, as Huxley long ago pointed out. We should, however, bear in mind that few people are in an ideal sense absolutely fit. We have all grades of impairment, and in the full utilization of our increased knowledge we not only save the unfit but improve those of alleged fitness, affected with the lesser degrees of impairment.

This work of improving present existing stock has, of course, its limitations. It is one of immediate, urgent need, in order that our country may be strengthened for the work of the next quarter-century; but, taking a long-distance view, we must recognize the imperative need of setting in motion rational eugenic as well as authenic methods of safeguarding our future.

At least the gross contamination of the stream of germ plasm can be prevented by elementary precautions with regard to the mating of the grossly unfit. Neglect to do this effectively is so stupid a concession to medieval tradition that we may confidently expect that effective action along these lines will soon be more uniform throughout the country.

When we consider the amount of energy and money and time and human intelligence that has been exerted to provide the superficial appurtenances of civilization; how we have girdled the earth with wireless telegraphy and the telephone; our undersea and overhead activities; and all the marvelous developments that science has provided for amusement, for dissipation, for money-getting, for warfare, for destroying human life—it is rather pitiful to think of our helpless condition as we face the average man of to-day and his physical equipment.

The condition of the average individual as a structure is a lamentable contrast, for example, to the magnificent condition of this skyscraper in which we are holding this meeting—the one perfect in all its details, a splendid monument to human business and artistic genius; the other a reproach upon our civilization in its condition of physical inadequacy, of infection, of faulty development, of maladjustment to environment.

If this maladjustment were necessary, it would be well to make the best of it and not talk so much about it; but, fortunately, it is to a very large degree preventable and positively not to be accepted as necessary.

This picture I have drawn of the bodily condition of the civilized American may not be impressively optimistic, but it happens to be true; and this is a time when, with optimism as our background, we must place the bald facts in the foreground if we are to have effective action directed to safeguarding our country. With the leading nations of the world in a death grapple we can not stand idly by as children viewing a tragic film play, and trust to luck for everything to come out right. Action is needed. The insurance companies can mobilize for physical preparedness among the people. Will they do it?

## LIFE INSURANCE AND THE WAR

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LIFE insurance serves two great purposes—protecting the home against the untimely loss of the income-producer, and inculcating the spirit of thrift by rendering easy and systematic the saving of small sums over a long period of time into a substantial amount for protection against dependency in time of need or old age. War, on the contrary, is instrumental not only in destroying many breadwinners in the prime of life, but, by wasting and depreciating the savings referred to, hampers and weakens the great institution of life insurance in the proper fulfillment of its noble mission.

In discussing the effects of the present war upon life insurance, only passing mention need be made of American companies. Business in the United States is to-day admittedly on a war basis, and what has

proved to be a source of misfortune to other leading nations in a business way has been the cause of unprecedented prosperity for us. This prosperity, with its great increase of employment and wages, its enlargement of production, and its abundance of credit at remarkably low rates, has been reflected favorably in the record of American life-insurance companies. The volume of business in the regular companies increased during the year 1915 by over $1,250,000,000; the payment for surrendered policies shows only a normal increase; while loans on policies were the smallest since 1909, the increase amounting to only about one half that recorded for the years 1914 and 1913. Considerable interest has also been manifested concerning the effect of the war on the policies of various American companies issued in Europe prior to the beginning of hostilities, and at the ordinary rates of premium. Yet, judging from Mr. John S. Thompson's excellent paper on "The Recent European War Experience of the Mutual Life Insurance Company of New York,"[1] the mortality under such policies has been but little in excess of the mortality experience during peace times and amounts to but a trifle of the total claims paid on all domestic and foreign business combined. During approximately the first year of hostilities the war losses of the Mutual Life Insurance Company amounted to but .196 per cent. of the $202,990,000 of business in force on July 1, 1914, in the belligerent nations of Great Britain and her colonies, France, Belgium, Italy, Germany and Austro-Hungary.

In discussing the immediate effects of the present deadly conflict upon life insurance, we are concerned primarily with the situation as it presents itself in the leading belligerent nations. When invited to discuss this subject, I was reluctant to accept because of the limited and fragmentary character of the information at hand, and also because the extremely deadly nature of the present war makes the use of records established in previous wars dangerous, if not useless for purposes of comparison. In view of these circumstances, the thoughts presented in this paper are not meant to be final in any sense. They can not be. They are tentative suggestions relating to present and future problems growing out of the war, and are offered with the hope that they may be kept in mind for detailed study when the war is ended and full facts shall be available. For purposes of convenience, this paper is presented under four main headings, (1) the financial effects of the war as exhibited by depreciation in security values, increased taxation, increased lapses and policy loans, and decreased volume of new business; (2) the extent and effect of war claims, and the mortality among civilians in the belligerent nations; (3) the use of policy restrictions upon military and naval service; and (4) the after-war effects on those who serve in the armies.

[1] *Transactions of the Actuarial Society of America*, Vol. XVI., Part II., pp. 297–314.

### Financial Effects of the War

Probably the most serious immediate effect of the war upon life offices abroad was the depreciation in the value of their securities, occasioned chiefly by the fact that new high interest-bearing government bond issues set up a new standard of interest rates which operated adversely to existing low interest-bearing bond issues held by the companies. Since all the belligerent governments have been obliged to bid for funds at greatly increased rates, it may be assumed that the problem of depreciation in security values is common to all the belligerent countries of Europe. Unfortunately, it is not possible to estimate this depreciation even in England. Many offices revalue their assets only every five years, thus making it difficult to separate the effect of depreciation prior to the war from that occurring subsequently. Most of the official returns, moreover, supply no detailed information concerning the securities owned, as is done in the United States and Canada; and there is, furthermore, a lack of uniformity in the basis of valuation adopted for different types of securities.

The importance of this depreciation from the standpoint of English offices is exemplified by the facts presented for the Prudential Assurance Company (with total assets of £94,777,842 at the close of 1915) at its last annual meeting by Mr. Thomas C. Dewey, the chairman of directors. According to his statement:

> **The issue of a 4½ per cent. war loan in July, 1915, followed by the sale of 5 per cent. Exchequer bonds, altered the whole standard of interest rates. The result was a further depreciation in the market value of all interest-bearing securities, and, although this depreciation has to some extent been disguised by the retention on the Stock Exchange of minimum prices, yet it would be idle to ignore its existence.**

Accordingly, he explains, since the beginning of hostilities the company has adopted the policy of "carrying substantial amounts of investment reserve funds rather than further writing down the value of its securities." To the beginning of March, 1916, £2,600,000 was thus added to the investment reserve fund. In addition £700,000 was carried to a special contingency fund in the Ordinary Branch to meet any emergency which might arise. In all £4,100,000 was added to reserve funds of various kinds to meet the special conditions imposed by the war. And it should be remembered that during the six years preceding the war, this large and representative company wrote down its securities by over £5,000,000.

In viewing the above situation, however, a hopeful view of the future is still taken, because life-insurance companies are seldom obliged to sell securities since their premium and interest income nearly always exceeds the current requirements for claims and expenses, because loans of various kinds are constantly being paid off, thus furnishing a constant supply of funds for fresh investments yielding a higher rate of interest, and because of confidence in the ultimate recovery of the securities which

have been written down, it is believed, only temporarily. To again quote Mr. Dewey:

> **So long as the interest is duly paid, so long as we have good reason to believe the capital will be paid, and so long as we do not have to realize, we maintain that such securities are quite as valuable assets of the company as they were at the date of purchase.**

Some British offices, it may be stated, have partially compensated for the depreciation in their assets by adopting a higher future rate of interest for valuing their liabilities than had been used at the previous valuation, while others have, owing to the serious inroads into surpluses, reduced or omitted entirely their rates of dividend or bonus distribution.

Against the loss from depreciation, the only direct gain is the increase in interest that is being realized, and the likelihood that interest rates are apt to continue high for some time to come. But this factor is counteracted by the great increase in the income tax for what is likely to be a long period. In the United Kingdom the tax has now reached 5s. in the £ for life offices, and is assessed upon their interest from investments, after deducting the expenses of management, and not upon profits. The extent of the burden is indicated by Mr. Dewey for the Prudential Assurance Company when he stated at the last annual meeting:

> **The war has had the effect of decreasing all three main sources of profit—favorable mortality, interest earned in excess of the rate assumed in the valuation, and saving in expenses. . . . The rate of interest earned in 1915, after deduction of income tax, was £3 19s. 6d., as against £4 3s. 10d. in 1914. The reduction is almost entirely due to the increased income tax to which we have been subjected.**

Another very noticeable result of the war has been the heavy investment by life offices in all the belligerent countries in war loans. Not only have the new funds of the companies, accumulated from day to day, been invested in this manner, but also a substantial part of their old funds which had previously been invested in American and other securities and which could be liquidated abroad and reinvested at home to greater advantage in high interest-bearing war bonds. The total extent of such investments can not yet be ascertained, owing to the absence of official reports. But that the movement has reached large proportions in all the leading belligerent nations is beyond question.[2] It has been stated, for example, that life insurance organizations in Germany with assets of $750,000,000 in 1913, had, by the beginning of 1916, subscribed $120,000,000 to the German war loans. An analysis of the annual reports of six important British offices shows that their holdings

[2] **Mr. S. G. Warner, president of the Institute of Actuaries, at a meeting of the institute in London, November 27, 1916, estimated that "since the beginning of the war British life offices have invested in British government securities of various kinds upwards of £75,000,000. They have sold or lent to the Treasury, under its schemes *A* and *B*, securities of the face value of over £46,000,000."**

of British government securities increased between December 31, 1914, and December 31, 1915, from £1,618,599 to £16,049,727, an increase of 892 per cent. At the close of 1914 the total assets of these six companies amounted to £119,941,781 and British government securities represented only 1.3 per cent. By the close of 1915 the total assets of these companies aggregated £124,396,876 and the holdings of British government securities (£16,049,727) had risen to 12.9 per cent. If this showing averages approximately the same for all the offices in the United Kingdom, life insurance has truly proved a great financial aid to the prosecution of the war. One of the six companies referred to, with total assets of £6,503,916, increased its holdings of British government securities during 1915 by 1,548 per cent., and the same amounted to 17.5 per cent. of its total assets. The Prudential's holdings amounted to £13,247,432, or 18.6 per cent. of the total assets assigned to its industrial department plus 9.8 per cent. of the assets assigned to its ordinary department. At the close of 1914 the two percentages stood, respectively, at only 2.9 per cent. and .3 per cent. As a matter of further interest it may be stated that during the year the Prudential took advantage of the fluctuating rates of exchange and sold to neutral countries £1,200,000 of their own securities, this action, in the words of its chairman, "being not only of advantage to the company, but of assistance to national interests, as it brought back capital from abroad for investment in our own country." Of course, all published accounts manifest the utmost confidence in these prodigious investments in government securities, since the investment rate is high and the safety of the principal assumed to be unquestioned. Let us hope, for the sake of life insurance in all the belligerent nations, that the prolongation of the war and the continued drain upon national resources will not be such as to prove this confidence to have been misplaced.

At the outbreak of the war widespread fear was entertained that unemployment on a large scale would lead to a great number of lapses. In fact, legislation relating to industrial policies was enacted in England (The Courts (Emergency Powers) Act) to the effect that certain classes of industrial policyholders might, during an indefinite period, suspend the payment of premiums and at the same time retain the benefit of their insurance. This emergency legislation was enacted in the expectation that large classes of the industrial population would, as a result of the war, find their occupations gone or their incomes greatly reduced. Such fears, however, proved entirely unfounded, since in England the working classes, owing to the industrial demands of the war, have enjoyed constant work at high rates of pay. I am also advised that in Germany the situation is not nearly so bad as originally expected, that the premium income of the companies has been quite regular, and that the lapse ratio has not been unusual. In all probability some importance should be attached to the mental effect which the

great world calamity has had upon the careless in influencing them to continue their policies in the interest of preparedness against death.

Detailed information concerning the lapse ratio is again obtainable only for English companies. In the case of 35 British offices[3] the total amount paid by the companies during 1915 was only £2,166,000, against £2,247,000 in 1914 (a decrease of over 3 per cent.) and against £1,955,700 in 1910, an increase of only 10.7 per cent. The 1916 ratio to life and annuity funds was only 0.6 per cent. as compared with 0.7 per cent. for the years 1914 and 1910 and an average of about 2.3 per cent. for American companies. In the industrial business of these companies the sum paid during 1915 was less than in 1914 by over 15 per cent.

Another fear at the outbreak of hostilities was the likelihood of policyholders resorting to a wholesale utilization of the borrowing capacity of their policies. In anticipation of this contingency and to forestall the expected rush, many British offices announced higher rates of interest for new loans, and in some cases rates on existing loans were also increased. But, as in the case of surrenders, this misgiving was entirely unwarranted, and for the same reasons. For 28 British offices[4] the amount of policy loans outstanding at the end of 1915 showed a slight decrease as compared with the close of 1914, the ratio to life and annuity funds decreasing from 7.7 to 7.6 per cent. These ratios are but slightly higher than the 7.2 per cent. recorded in 1910–11, and compare very favorably with the ratio prevailing in the United States. In Continental Europe, judging from the limited data at hand, the situation was not so favorable. My information is to the effect that in Germany, at the outbreak of the war, the procurement of money to meet the big demand for policy loans constituted a real problem and that for this purpose a "Bank of German Life Insurance Companies" was created which loaned money on securities.

But while, in view of the circumstances, the lapse and policy loan ratios did not prove unfavorable, this can not be said concerning the volume of new business written. This is as might be expected, owing to the call to the colors of some millions of fit men who otherwise would have constituted a fertile field for new insurance; to the inability of the companies to undertake the war risk without charging almost prohibitive premiums; and to the absorption into the ranks of the army of a large proportion of the companies' agency forces. To some extent, too, the poor dividend results shown since the outbreak of the war may possibly have proved an adverse factor. According to English insurance journals, French life offices are generally reporting greatly reduced new business returns, partly because the enemy is in possession of the great industrial districts of the north and partly because the majority of the district managers and agents of the companies have been called

[3] For detailed summary see the *Economist*, September 16, 1916.

[4] For detailed summary see the *Economist*, September 2, 1916.

to the colors. The last factor must also be an important one in Germany. In England the volume of new business for the year 1915, written by 14 companies[5] within the United Kingdom, shows a decline of 8.5 per cent. as compared with the preceding year. Seven of these companies wrote business outside of the United Kingdom, and the volume of such business shows a decline of 37.5 per cent. Our list includes two industrial companies—The Prudential and Refuge—and it is interesting to note that, despite the difficulties enumerated, their new ordinary business for 1915 exceeded that of 1914 by over 5 per cent., while their industrial business remained practically the same. If, however, the industrial business be omitted, the total new ordinary business of the 14 offices referred to shows a reduction of approximately 20 per cent. as compared with 1914.

### Extent of War Claims

But while the financial effects of the war in their relation to life insurance have been serious, our thoughts naturally turn to the extent of war claims paid. The deadly nature of the present war is indicated by the data relating to deaths reported up to July 31, 1915 (and covering over 11 months of actual hostilities) among 11,819 officers serving in British regiments of the regular army at the commencement of hostilities, which was submitted by Mr. D. H. Gordon-Smith to the Insurance Institute of Yorkshire. In the infantry branch the loss ratio reached the unusual figure of 18.3 per cent.; in all the combatant branches it reached 13.2 per cent.; while for all services it averaged 11.9 per cent. These figures contrast unfavorably with the rate of mortality in the British army during the South African War of only 5.3 per cent. per annum among officers and 3.8 per cent. among non-commissioned officers and men.[6] Mr. Gordon-Smith's figures, however, do not include officers missing or unofficially reported killed or dead, and many of these probably were numbered later among the dead. In his excellent paper on "The European War Risk with Particular Reference to the Practise and Experience of Canadian Companies," Mr. Arthur B. Wood concludes, although obliged to make many assumptions in reaching his conclusions, that the death rate during the first 11 months of hostilities for officers among the first division of Canada's expeditionary forces was 16.0 per cent., for other ranks 11.4 per cent., and for all combined 11.5 per cent.[7] These figures are indeed impressive, especially when it is borne in mind that the deadliest campaigning of the war probably occurred subsequent to the period referred to.

[5] For detailed statement see the *Economist*, July 8, 1916.

[6] This data is summarized in Arthur B. Wood's paper on "The European War Risk with Particular Reference to the Practise and Experience of Canadian Companies," *Transactions of the Actuarial Society of America*, Vol. XVII., Part I., p. 57.

[7] Wood, p. 59.

Since permits for military and naval service were not generally required under policies issued by English and Canadian companies prior to August, 1914, it is most difficult to ascertain even approximately the amount of insurance at risk on the lives of those who enlisted. While the rate of war mortality based upon insurance exposure is an all-important subject for study, no conclusive data along this line has yet become available. Various statements, however, showing the effect of war claims upon mortality as a whole have been made. Mr. Wood presents an interesting table showing "the percentages which the net death losses (sums issued less reserve thereon) during the year ending December 31, 1915, were of the expected by the $O^{m(5)}$ Table" for eight Canadian companies. Summarizing his table, Mr. Wood concludes that:

> **The total mortality including war claims is seen to have been remarkably favorable in every instance, the ratio of actual to expected ranging from 42.6 per cent. to 72.9 per cent., while for the eight companies combined it was 58.4 per cent. The net loss on the war claims for the combined companies was 13.3 per cent. of the expected claims. The gross war claims for nine companies combined were .134 per cent. of the mean Canadian business in force. . . . The gross Canadian claims incurred by the 9 companies were $5,834,822, of which $900,869, or 15.2 per cent., were due to the war. The war claims reported by the Canadian companies include deaths from all causes among combatants and also deaths among non-combatants through acts of war, such as the sinking of the *Lusitania* and other vessels.[8]**

Some idea of what war claims have cost the English companies may be obtained from the instructive table published by the *Economist* under date of August 12, 1916, giving the war mortality claims for 52 British companies for the years 1914 and 1915. It should be noted, however, that in the case of 7 companies the last year covered by the report ends somewhere within 1915, while in six instances the last year reported runs into 1916. Total war claims paid by the above offices for the first 17 months of the war amounted to £4,313,300. In 1915 such claims totaled £3,042,500, or 11.6 per cent. of the total death claims. In 1914 war claims totaled £1,270,800, or 5.5 per cent. of the aggregate claims for the year, and 13.2 per cent. when based on the five months' duration of the war during that year.

A further analysis of the table shows that the experience of different companies varies considerably. In 6 instances war claims amount to 5 per cent. or less of the total death claims; in 16 cases over 5 per cent. and less than 10 per cent.; in 14 over 10 per cent. and less than 15 per cent.; in 6 between 15 per cent. and 20 per cent.; in 6 between 20 and 25 per cent.; and in 4 over 25 per cent. Of the last four companies, three experienced, respectively, the very high ratios of 28.3 per cent., 34.8 per cent. and 44.6 per cent. But with these relatively few exceptions it may be said that English companies have not thus far found war risks a greater burden than anticipated, and up to the end of 1915 few companies are said to have reported a mortality in excess of that pro-

[8] Wood, pp. 55–56.

vided for under the standard table in use. Moreover, new policies issued to soldiers and sailors have carried heavy additional premiums, and the companies have, as a consequence, had the benefit of considerable extra revenue in respect to the war risk assumed. Regular life-insurance companies have also been affected less than might be expected because the great majority of those on the firing line are young men who either carry no insurance at all or who, when insured under regular policies, carry, on the average, only a moderate amount of protection. The war losses paid, however, by English companies have reached such proportions that all published accounts seem to recognize the seriousness of the decision by the companies at the commencement of hostilities to charge no extra premium to existing policyholders who should enlist in active military or naval service.

Since by far the largest number of men at the front belong to the classes normally covered under so-called industrial policies, it follows that the industrial companies in England have had to pay a very large number of claims. But here the redeeming feature from the standpoint of the companies is that the average individual payment is small, only about £18. By April, 1916, 7 English industrial companies had reported 61,005 war claims aggregating a total of £1,135,046. Of these, one company—the Prudential—paid 38,479 claims aggregating £830,614. For the year 1915 the war claims of this huge company, whose policyholders are representative of the whole of the United Kingdom, constituted 11.4 per cent. of the total death claims. This percentage should be compared with Mr. Wood's estimate of 11.5 per cent. as the combined death rate for all ranks in the first division of Canada's expeditionary forces during the first eleven months of hostilities, and with 11.6 per cent. representing the combined ratio of war claims to total claims during 1915 for all the 52 companies already referred to.

Little direct information is at hand to indicate the war claim experience of life-insurance companies in Germany, France and Austro-Hungary. In these countries, however, the companies have generally seen fit in the past to protect themselves by incorporating a war clause in all their contracts to the effect that, unless an extra premium is paid for a permit to engage in naval or military service, the company will pay only the reserve value on policies in case of death during the period of such service. The war risk of these companies is thus greatly minimized. Again, the war risk is confined largely to the younger men, many of whom are not insured at all with companies, and who, as a class, only infrequently carry large policies. The older men, who are naturally the most heavily insured, are not exposed to the hazard of the younger men on the firing line, since they are, although in the active service of the army, engaged in policing railroads and towns, looking after the shipment of rations and munitions and in similar less hazardous duties; and the mortality among them is probably not far different from that pre-

vailing in normal times. Moreover, the four scourges of past wars—typhoid, typhus, cholera and lockjaw—have, according to medical experts recently returned from the front, been practically wiped out in the French and German armies. Evidence, gathered through correspondence and interviews with those familiar with the situation, also shows that the mortality among the civilian population of Germany, despite an increased death rate from industrial accidents attributable to the speeding up of war industries, and the wholesale rearrangement of the working personnel, has been considerably lower than the average during years of peace, a situation probably traceable to a more restricted diet, more efficient and universal care, reduced use of alcoholic beverages, and much more constant and compulsory physical exercise.

Considerations like the foregoing have led to an experience on the part of Continental European offices much more favorable than was expected at the beginning of the war. According to advices obtained through correspondence, the death rate of policyholders in German companies was considerably higher during 1914 than in the year preceding the war, although not equal to the tabular expected mortality; while during 1915 the actual mortality to the tabular mortality expected was lower than in 1914. The 50th annual report of the Prussian Life Insurance Company,[9] one of the leading German life offices, is of interest in this respect since it covers seventeen months of actual hostilities. At the outset of the war this company is reported to have had nearly 66,000 policies outstanding (representing $74,330,000 of insurance) and the vast majority of these policies, we are informed, were on the lives of men within the age limit for military service, the company thus having a very considerable exposure to the war hazard. The average policy for all insurance was, according to the report, about $1,200, but the average loss per person in military service is reported at only $577, due mainly to the smaller than average amount of insurance carried by the younger men. Notice should be taken of the fact that the maximum amount of insurance carried by this company on any one life is about $6,250. During the first seventeen months of war, eight war claims resulted for each 1,000 lives insured. In 1914 the claims incurred from war ($118,512) amount to 11.6 per cent. of the total claims paid, while the total mortality from all causes, including that incurred from war, equalled 110.6 per cent. of the year's tabular expected mortality. In 1915 the war claims (185,630) represented 16.3 per cent. of the total claims paid, while the total mortality from all causes, including war, amounted to 105 per cent. of the tabular mortality for the year. In all probability the extra charges for, or policy restrictions concerning, the war risk left the company largely unaffected by the increased mortality from war, since we are informed that the company was enabled to continue its long-established dividend of 16 per cent. per annum to its

[9] Summarized in the *Economic World* for July 22, 1916, p. 115.

stockholders, to give to its participating policyholders an amount equal to the distribution of previous years, to set aside a special reserve to meet war claims in 1916, and still to show a surplus of almost $2,000,000 as compared with reserves of about $20,000,000.

### Policy Restrictions relating to Military and Naval Service

Space limits make impossible more than a brief outline of the methods adopted by the companies of a few of the leading belligerents in assuming the war risk. Detailed information is at hand as regards the methods adopted at present in Canada, England and France. Concerning Germany, however, the available information as to what is done at present is so scanty as to make any detailed statement impossible. It may be stated at the outset that, at the commencement of hostilities, Canadian and English companies voluntarily waived all war restrictions in policies previously issued, and assumed the war risk without any extra premium charge. On new business, however, restrictions were imposed and an extra premium demanded. The following résumé merely presents the main outlines, so as to show the principal points of similarity and difference:

1. In Canada[10] the companies follow the general plan of permitting service in the militia within Canada, but require notice in case of foreign service. Most of the companies require such annual extra premiums as they may fix; some provide that the premium shall not exceed 15 per cent. per annum of the sum insured; while one company, at least, charges a single extra premium, grading the same according to the amount of insurance, and agreeing to refund, at the close of the war, such portion of the extra premium as the company shall determine in view of its experience. On failure to comply with the terms of the war clause, some companies provide for the return of all premiums paid, with 5 per cent. compound interest if death should occur during service or within a stipulated period thereafter; others return the legal reserve; others agree to pay 25 per cent. of the face of the policy; and at least one company declares the policy to be null and void. A few companies refuse altogether applicants who have enlisted in foreign service or intend to do so. According to Mr. A. B. Wood:

> **The extra premiums charged range from 7½ to 15 per cent. per annum of the sum insured.**

2. In England[11] the conditions under which the war risk is assumed vary greatly and many companies are declining the risk entirely. When the risk is assumed and the insured engages in war service abroad, without having paid the extra premium, some companies limit the sum payable at death to double the premiums paid during the war and a stipu-

[10] **Arthur B. Wood, "The European War Risk with Particular Reference to the Practise and Experience of Canadian Companies,"** ***Transactions of the Actuarial Society of America,*** **Vol. XVII., Part I., pp. 49–54.**

[11] **For a fuller account see the** ***Insurance Record*** **(London), September 15, 1916, pp. 434–435.**

lated number of months thereafter; others return only the premiums paid; and others reduce the sum insured to 10 per cent. (or some other stipulated percentage) during the first year of service, increasing the amount by 10 per cent. (or some other designated percentage) for each succeeding year of service up to the full sum insured. At the termination of the war, the companies usually provide that the policy shall be reinstated to the full sum insured, if satisfactory evidence of health is furnished. If the evidence is not satisfactory, some companies return all the premiums paid; others increase the insurance yearly, according to some plan, up to the full amount; while others call for no evidence of health and will reinstate the policy to its full amount. According to the *Insurance Record,* under date of September 15, 1916, the extra premium at the beginning of hostilities was generally seven guineas per cent. annually; while "subsequently ten, then fifteen guineas were quoted, and to-day the standard rate is nearer twenty guineas." Moreover, we are informed that the offices usually limit their risk to £1,000 or less.

3. French policies, it is stated,[12] usually contain the following military and naval service clause:

> **The policy shall not be forfeited if the extra premium is not paid; but if the assured die within eight months of the cessation of hostilities, the company will pay to the beneficiaries only the reserve instead of the full face value of the policy.**

The eight months' limitation, we are informed, has been reduced to three months at the suggestion of the government. According to the *Post Magazine and Insurance Monitor,* under date of May 27, 1916,

> **An extra premium of 10 per cent. of the sum assured has been paid by soldiers and reservists of regiments of the line; 7½ per cent. by territorials and their reserves; and 5 per cent. by the non-combatant branches of the army. Originally, these extras were intended to cover one year only, but upon the request of the government the companies agreed to make no additional charge for the second year.**

According to the same journal under date of August 19, 1916, the companies decided at the beginning of the third year of war not to ask for a new extra premium. It should be added that the companies decided, at the request of the government, "to proportionately return to policyholders after the war sums received for war risk premiums over and above the total amount of claims caused by the war."[13]

### After-war Effects on those who serve

In discussing the war risk, sight should not be lost of the after-war effects on the fifteen or twenty millions who have served in the present war. The importance of this subject can only be inferred at present and certainly will and should be the subject of careful study following the close of hostilities. Many who studied conditions at the front are ap-

[12] John S. Thompson, "Military Service and Its Bearing on the Policy Contract," *Transactions of the Actuarial Society of America,* Vol. XVI., Part II., p. 302.

[13] *Post Magazine and Insurance Monitor,* May 27, 1916, p. 393.

prehensive of the ultimate mortality results. My information is that a large proportion of those serving in the armies has been affected by heart and kidney ailments, trench nephritis, and venereal diseases, and that, judging from the past, these ailments affect the future vitality of the victims. Apprehension is also felt by many concerning the future vitality, especially from the standpoint of tuberculosis, of the three million or more prisoners of war. Badly treated from the standpoint of sanitation, living mostly in idleness, and subjected to an unaccustomed diet, a very large number, it is felt, will leave their prison camps as sub-standard lives.

In conclusion it may be said that the adverse financial and mortality effects of the war, as outlined in the preceding pages, have made serious inroads into the surpluses of practically all companies. What the future holds in store will necessarily depend upon the length of the war. Fortunately, the companies practically everywhere pursued a very conservative policy prior to the outbreak of hostilities. Premiums were computed on the basis of mortality tables which leave a large margin of safety, and on assumed interest rates equal to only about two thirds of the return actually realized in normal times. Had such conservatism not been practised there would in all probability have resulted a large number of failures, and the future would have been dismal indeed. As far as English companies are concerned, anxiety at present is limited chiefly to a consideration of how far dividend distributions to policy-holders will be affected. Many have already reduced the same, and some have, as an act of caution, omitted a distribution altogether. Judging from numerous statements made, the hope seems quite general that the adverse financial and mortality results of the war thus far can be made good by the mortality gains of a few subsequent years.

For American companies the experience and practises of foreign companies in relation to the assumption of the war risk has an important bearing. The writer is convinced of the advisability of incorporating a war service clause in future American policies, the same to remain in force during at least the first ten years of the contract. Foreign experience during the present war seems to indicate that, under such a clause, the companies should be given latitude in charging such extra premiums as they may determine necessary. It is also felt that careful consideration should be given to the propositions: (1) of considering the extra premium feature as participating in character with a view to refunding any excess extra premium following the close of hostilities; and (2) of ascertaining the most equitable method of reinstating the policy upon the cessation of hostilities, should the insured, for causes arising from the war, be unable to produce satisfactory evidence of health. The desirability of a careful consideration of the relation which the government should bear equitably to the war risk is also suggested, since the burden to some extent, it is believed, should be borne by the community as a whole.

# MYTH AND ERROR IN THE RISE OF NATURAL HISTORY

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NATURAL history is the raw material from which all the other biological sciences are made. As long as false notions made up a considerable part of conceptions regarding plant and animal life, rapid progress in those sciences was impossible. A survey of the "rubbish" in the rise of natural history explains, in some measure, why this progress is comparatively recent.

It is astonishing how long a myth or superstition, once it gets the popular ear, can live and thrive on mere repetition and, like Vergil's bird of Rumor, attain larger proportions as it goes. Darwin points out that in science false observations are far more serious than false theories. False notions must be discarded altogether before the foundations of a true theory can be laid. False theories, on the other hand, lead directly to true theories if the data on which they are based are true.

We are accustomed to think of mythology as emanating chiefly from Greece and Rome—a consequence of our over indulgence in classical studies. As far as ancient natural history is concerned we get more truth and less fiction from Grecian sources than from any other nation or from any other of the twenty centuries following that of Aristotle.

He, of course, is rightly regarded the father of natural history. While there is evidence that some valuable scientific work had been done previous to the fourth century, B.C., especially in medicine, yet to Aristotle must be given the credit of instituting the right method in advancing knowledge of natural phenomena. Notwithstanding the fact that he may have had some good authorities for reference, and the resources of Alexander's kingdom at his disposal in writing a natural history, yet his "Historia Animalia" is a remarkable achievement.

In reviewing a translation of a fragment of his work we note the following: That he classified sponges as animals and that he possessed accurate notions of the essential features and relations of mammals. He recognized ruminants by their four stomachs, the parts of which he describes in detail. He is more accurate in his knowledge of the circulation of the blood than most observers down to the time of Harvey. He treats of mollusks, crabs, etc., so as to leave no doubt that he had closely observed and studied them. He declared that the nature of animals and vegetables are similar. He had worked out a pretty accurate knowledge of bees and grasshoppers. He had observed the development of the chick embryo from three days on. His discussion of reproduction in fish—ova

and spermatozoa—and their relations accords with the teaching of modern biology.

Osborne says of him:

> He distinguished five hundred species of mammals, birds and fishes, besides exhibiting an extensive knowledge of polyps, sponges, cuttle-fish and other marine forms of life. He understood adaptation of structure to function, distinguished between homogeneous tissues made up of like parts, and heterogeneous organs made up of unlike parts; he perceived the principle of physiological division of labor, unity of plan or type in certain classes of animals, and the forces of hereditary transmission.

For the most part Aristotle steered clear of mythical notions about animals that must have been generally believed by his contemporaries. His errors are many, but very pardonable when we consider his is the first real attempt to write a natural history. He speaks, for instance,

> of flying reptiles; other reptiles move by four limbs.
> In all animals the brain is without blood.
> The mammalian heart has three cavities.
> The lion has one bone in the neck, but no vertebræ.
> There is a kind of ox which has a bone in its heart and there is also a bone in the heart of the horse.

He seemed to accept the general belief that the eyes of serpents and swallows, if pierced with a pointed instrument, would grow again.

> If sheep drink of certain waters they will produce black lambs. And in Antandria there are two rivers, one of which turns the sheep white and the other black, and the Scamander appears to make the sheep yellow.
>
> All insects survive being divided, so that wasps live after being cut asunder—only the head will not survive alone.
>
> Eels, many insects, and some other animals spring from putrid matter; bugs from moisture, and some insects from the dew upon the grass.

He credits the story that the salamander puts out fire by walking over it. He says:

> Honey falls from the air—no honey is produced before the rising of Pleiades.

He believed that the fertilization of the egg was often brought about from the breath of the male, for if the hen of the partridge stands in the way of the breath of the male she conceives.

He thought that certain fish produced ova under the influence of the stars, and that sheep and goats produce males or females according to the water they drink.

When the wind is high bees carry a stone with them for a balance.

The bones of animals depend upon one bone and are connected with each other like the "veins," and there is no such thing as a separate bone.

Besides Aristotle's no other work has come down to us from the Greeks that ranks as natural history.

The Roman empire likewise produced but one naturalist—Pliny. But Pliny does not rank with Aristotle. In the first place he attempted

to encompass all knowledge and must therefore have depended upon others for most of his information. And, though hating the Greeks, he acknowledges Aristotle his chief authority. The best of his work is Aristotle's, but it is mingled with more matter from other and less reliable sources.

The treatment of the elephant well illustrates the difference between the two. Aristotle's would take rank with that of an author of modern biology. But Pliny says the elephant has religious respect for the stars and veneration for sun and moon and that they purify themselves in the new moon. He speaks of a dull, domesticated elephant conning over his lessons in the night time. If an elephant meets a man lost in the desert he is merciful and points out the way.

Pliny credits other wonderful tales, such as the following:

Ethiopia produces horses with wings. A wild beast is found there characterized by a remarkably heavy head, being bent always toward the earth. Were it not for this it would prove the destruction of the human race, for all who behold its eyes fall dead upon the spot.

There is the same power also in the serpent called the basilisk—it destroys all shrubs by contact and by its breath; it burns up all grass and breaks the stones. To this dreadful monster the effluvium of the weasel is fatal.

Pliny couldn't believe the following, however—by a Grecian author of note:

> A member of the family of one Anthus is chosen by lot and then taken to a certain lake in the district, where after suspending his clothes on an oak, he swims across the water and goes away into the desert, where he is changed into a wolf and associates with other wolves for a space of nine years. He returns to the same lake, swims across, resumes his original form, only with the addition of nine years to his former appearance—and takes his former clothes as well.

Pliny adds:

> It is really wonderful to what a length the credulity of the Greeks will go.

We are quoting this to prove that his own credulity had a boundary.

He believed that certain animals possess knowledge of medicinal remedies, and devotes a whole chapter to that subject—every statement of which is doubtless fabulous. The dragon, he says, relieves itself of nausea which affects it in the spring, with the juices of the lettuce. The elephant counteracts the poison of a devoured chameleon by means of the wild olive, and the stag, the effects of poisonous plants by eating artichokes. Wood-pigeons, partridges and blackbirds purge themselves once a year by eating bay leaves—ducks, geese and other aquatic birds by vervain—cranes with bulrush, etc. Canine madness is fatal to man during the thirty days heat of the star Sirius; but dogs will never become rabid if on the fortieth day after the birth of the pup the last bone of the tail is bitten off. He says nature has also bestowed upon animals the

power to presage wind, rain and storm, each in its own peculiar way, and accepted as "Science" divination from birds as practised at Rome.

Pliny's is a ponderous work—thirty-seven volumes in "Natural History." He has been justly called a "compiler of anecdotes" rather than a naturalist. He performed the service, however, of keeping alive interest in natural objects, but perpetuated a mass of falsehoods which supplied delectable pickings for the blind centuries that followed. Even by some in the nineteenth century he has been spoken of as the "greatest naturalist of antiquity." He certainly wasn't that and it would appear in the light—or rather darkness—of succeeding ages, he not only performed no very valuable service to natural history other than that mentioned above, but rather added a lot of matter which would have to be discarded before real progress could be made.

Pliny turned the trend downward—the retrograde movement culminating in that period generally known as the Middle Ages. It is not necessary to go into the difficult task of explaining the existence of such a period.

The domination of the Christian Church by the clergy did anything but quicken interest in the study of nature or any other kind of science. It was an age that could debate with fervor the question as to how many angels were able to stand on the point of a needle but the prevailing asceticism and scholasticism brought about abhorrence for all earthly subjects. It was thought idle to give attention to the study of plants and animals, for the world was soon to come to an end anyway and the best preparation for the event was to give one's self up to pious meditation.

The theologians made the Bible the unfailing, infallible guide on all questions. To pry into the secrets of nature was regarded as impious, since the Creator revealed Himself all that He willed in the Bible itself. But the mention of animals and other natural as well as miraculous phenomena in the Old Testament led the theology of the period to produce a natural history peculiarly its own.

It is rather interesting to see what would happen in science under such auspices and against such a background.

The standard theological text-book of science was the "Physiologus." Under this title are embraced some fifty Christian allegories. As its imagery is almost wholly taken from the animal world, it is also known as the Bestiary.

There were current at the time many marvelous descriptions of animals—and descriptions of some marvelous animals—by such vague authors as "the naturalists" or "the naturalist" or under the vague title of "History of Animals," but the "Physiologus" came to be the one generally accepted and quoted by the clergy and most widely known among the people.

Andrew D. White, who has been the most persistent student of this period, says the "Physiologus" remained the principal source of thought on animated nature for a thousand years. A translation of this remarkable book may be found in the Harvard Library—a version by Phillip de Thanu (1121), an Anglo-Norman poet, whose work is edited by Thos. Wright (1841).

In his preface Wright claims that the "Physiologus" was "founded on the Natural History of Pliny with a mixture of medieval fables, many of which had been borrowed directly or indirectly from the Orientals."

The original Greek manuscript was composed probably at Alexandria sometime during the second and third centuries.

The theologians of the medieval period were not prepared to question any of the animal tales then current, no matter how unreasonable or phantastic they might be. Investigation, observation and experiment were entirely omitted. Whenever questions of any sort arose, whether in theology or natural history, the advantage lay with the one who could cite most authorities and marshal the material in a form that would be most convincing. It is said that a long and spirited discussion took place as to how many teeth are found in the horse, but none of the debaters thought of looking into the horse's mouth.

The theologians had but one use for zoological knowledge, anyway—to illuminate their texts. Contributing as it did to the various necessities of the pulpit and people, the "Physiologus" came to be of no very definite content—great liberties were taken not only with the outward form, but modifications and additions were made to suit the purpose of the one who used it. So it is hardly to be considered a literary work at all; nevertheless its symbols found their way into the rising literature and had a powerful influence on the fancy of artists employed upon church buildings and furniture. In fact the "Physiologus" is the key to the meaning of much medieval sculpture and many paintings found in European churches to-day.

As a book it had many versions in Latin, German, French and English and still exists in about a dozen languages East and West.

With such a wonderful history it is not a wonderful piece of literature. It embraces, as has been mentioned, fifty allegories, which were supplemented by descriptions of the miraculous power of precious stones.

The characteristics of animals, real or imagined, are mentioned only to adorn the moral that follows.

That of the *lion* is quite typical:

**What is in Greek *leun* has in French the name King. The lion in many ways rules over many beasts, therefore is the lion king, now you shall hear how—**

**He has a frightful face, the neck great and hairy, he has the breast before square, hardy and pugnacious—his shape behind is slender, his tail of large fashion and he has flat legs constrained down to the feet—he has the feet large**

and cloven, the claws long and curved—when he is angry or ill-disposed he devours animals without discrimination—as he does the ass which resists and brays, Now hear without doubt the signification of this.

The lion signifies the Son of Mary—He is the King of all people without any gainsay—He is powerful by Nature over every creature and fierce in appearance with fierce look. He will appear to the Jews when He shall judge them, because they made themselves guilty when they hanged Him on the cross—and therefore they have merited to have no king over them.

The square breast shows strength of the Deity—by the tail is indicated justice, which is placed over us—by the leg which he has flat he shows that God was constrained; and it was necessary that He give Himself for us—by the foot which is cloven, is demonstrance of God—who will clasp the world, will hold it in His fist; by the claws is meant vengeance upon the Jews: By the ass, we understand the Jews very rightly; the ass is foolish by nature as the Scripture says; he will turn from the way, if one does not drag him entirely to it.—Just such nature have the Jews who are as fools—they will never believe in God unless they do it by force; they will never be converted, etc.

The lion when he will hunt and will eat prey, with his tail in truth, as is proved, he makes a track on the earth and leaves an opening that it may be an entrance to the beasts which he desires—and such is his nature that there will never be any beast which will pass over his mark or go beyond it.

The tail by its nature shows Holy Scripture—and the tail is justice which is placed upon us; by the track we understand Paradise rightly, and the breach is the entry which is prepared for us, if we do good and avoid evil.

The lion when he is angry, he hangs himself by his feet—he will hang himself in the earth when he is enraged.

We understand Christ in the semblance of the lion, etc., etc. . . .

Again Scripture says the lion has this nature—when we hunt him with his tail in flying he erases his track on the ground that we may not know how to seek him—remember this is a great signification.

The lion in flying covers his track—the track of the lion means incarnation which God would take on earth to gain our souls—and thus truly he did covertly—he placed himself in degrees of which each order was, of prophets, of apostles, until he was carnal man and was mortal for us . . . and thus he vanquished the Devil. . . . The lion fears the white cock and he has such a nature that he sleeps with his eyes open—the white cock signifies men of holy life. . . .

The lioness when she brings forth a dead cub, holds her cub and the lion arrives. He goes about it and cries till it revives on the third day.

Having read the allegory of the lion one can judge pretty easily the correct interpretation of the others.

The devil has his counterpart in the dragon, crocodile, onocentaur, the salamander, the siren, the serpent, the hedge-hog, the monkey, the fox and the whale. Hell is the track made by the lion's tail, or it is the fox's hole, or the depths of the sea; Christ—the lion, the eagle, the goat, the phœnix.

Some very surprising statements are made about these animals:

The *serpent*, cunning, sly, and aware of evil . . . when it perceives people who want to enchant it, will press an ear against the earth, into the other press its tail firmly that it hear nothing of the enchantment—persons bitten by snakes will sometimes dry up and die by burning.

The *hedge-hog* after mounting the grapevine, throws to the ground the ripest of the clusters, then descends and rolls upon the grapes, sticking them to its prickles and thus carries food to its offspring.

The *fox* covers itself with red earth, and lies down as dead. The bird, which sees it, thinking it is dead, will come to peck at it—into the fox's mouth it will put its head and beak. The fox takes the bird with a jump and devours it.

The *wild ass*, on March 25th brays 12 times, also 12 times in the night. This is to indicate that day and night are of equal length.

The *monkey* carries its favorite offspring in front, those it hates, at its back.

The *whale* places the sand of the sea on its back, and remains tranquil. The sea-captain, spying this apparent island, disembarks and builds a fire thereon. The whale feels the fire and plunges with ship and people into the sea. The whale has such a nature that when he wants to eat he begins to gape . . . and sends forth a smell so sweet and so good that the little fish, who like the smell, will enter into its mouth.

The *eagle* carries its young toward the sun and only the fledglings that gaze straight at the sunlight are acknowledged by the eagle as kin. . . . Physiologus says further, of the eagle, when it becomes old and feels its wings heavy, and when its sight fails, then it mounts high in the air and burns itself in the intense heat—then it goes to the east, sees a clear fountain wherein it dips three times and becomes young again.

The *phoenix* is a bird which is very elegant and handsome—it is the only bird of its kind in the world, and its color is all purple—it lives 500 years or more. In old age it burns itself by the sun's rays sitting above a heap of spice twigs . . . and is reduced to powder and on the third day comes to life.

*Caladrius* is the name of a bird, all white. It can distinguish in a man the infirmity he has—truly if he must die it will not deign to look at him, but if it will look at him, know of a truth that by its look it takes all the man's ill, draws all the disease to itself and the man recovers.

The popular natural history up to the seventeenth century was of similar character.

It would appear that the "Physiologus" and like productions shaped the early drama. We refer to the miracle plays of the Church in which the reader will remember that the Devil and other leading characters were shown by representations of animals.

Shakespeare's times were characterized by gross misconceptions of animal life—the ideas inherited from the Middle Ages and sometimes even improved upon. His plays are full of references of this kind, but that does not mean, of course, that he himself believed them; but if he sought knowledge from what had been written he must have gotten very many erroneous notions of animal life about him. Holland's Pliny was read by some and probably there existed other works on more scientific principles, but they were in Latin and published abroad.

There can be little doubt that Bartholomew's "On the Properties of Things," written about the middle of the thirteenth century, was the standard authority of the period. Bartholomew was an English Franciscan monk, who began with the intent of explaining the allusions in Scripture to natural objects, but expanded his work to a survey of all nature. It was translated into the principal languages of Europe and

was widely read. For three hundred years it maintained its position—even after the invention of printing there were editions in several languags besides ten editions in Latin. As usual his descriptions were cast in a theological mould. Fabulous creatures of Scripture—the unicorn, dragon and leviathan—are described in detail.

Of the *Unicorn* he says:

> It is a right cruel beast and hath that name for he hath in the middle of the forehead a horn 4 ft. long and that horn is so sharp that he throweth down all that he rageth on. And this beast fighteth oft with the elephant. And the unicorn is so strong that he is not taken with the might of hunters, but a maid is set there, and the unicorn cometh and layeth his head on her lap, and leaveth all his fierceness and sleepeth.
>
> There be many kinds of unicorns—Monoceron is a wild beast shaped like to the horse in body and to the hart in head, and in the feet to the elephant, and in the tail to the horse.

Bartholomew says:

> If a crocodile findeth a man by the water's brim he slayeth him if he may—and then weepeth over him.
>
> When father and mother crows wax old and feeble, then the young crows underset them and rear them up with their wings . . . and bring their members that be diseased into state again.
>
> Dolphins follow man's voice and come together in flocks to the sound of symphony. They leap over ships, etc.

In Bartholomew the descriptions of animals are not supplemented by the minute allegory of the Middle Ages, still animals exist only to teach moral lessons. Some are made, he declares, as lions and tigers, so that man should realize his own infirmities; flies and lice to torment him; noxious animals of all kinds were created to punish him for his sins.

Sir John Mandeville was another contributor to zoological knowledge. His work is entitled "Voiage and Travaile, which treateth of the way to Jerusalem and of marvyles of Inde with other islands and countryes." This is a translation from manuscripts of about the middle of the fourteenth century.

It is in the quaint English of three hundred years ago, and seems to have been very popular. Toward the close of that century more manuscripts may be found of Mandeville's book than of any other literary production, except the Bible.

He is very careful to assure his readers that he is telling the truth. In one place he devotes nearly a half page in coating his story with pious assertions. That his readers required some means of assurance is evident, when one reads of his "folk in Ethiope, that have but one leg and they run so fast that it is a marveyle, and the foot is so large that it shadoweth all the body against the sun when they wish to lie and rest."

He avers that there are rats in China as large as hounds. In another isle, fishes of a certain kind come once a year and cast themselves upon the bank in such great multitudes that nothing but fish

can be seen. And there they remain three days and men gather as many as they like. But after the third day the remaining fish go back into the sea. After them come a multitude of another kind, and after them still another, till all the diverse manner of fishes have been there. Mandeville adds: "It is the most marveylle that ever I saughe."

He speaks of an entire island eight hundred miles long, literally filled with serpents, dragons and crocodiles. The island was supplied with an abundance of water, a great lake formed from the tears of Adam and Eve, who wept on the mountain above for one hundred years, after they were driven out of Paradise.

In the same country and others about are wild geese that have two heads. In India he found hens without feathers, but they had white wool like that of sheep.

In "Caldilhe" (wherever that might be) he found a "fruyt" growing on trees as though they were gourds. When they are ripe men cut them in two and find within a little beast, in flesh, bone and blood like a little lamb, but without wool.

Mandeville mentions at this point that he told the natives about the "goose barnacles" of his own country, which also were supposed to grow on trees, and to fall off into the water and swim about like geese.

In another place he found a people who live entirely on the smell of wild apples.

His travels contain a full account of many of the animal stories of the "Physiologus," including the fierce ants that hoard up gold, which is gotten from them by sending across the stream to the meadows where they dwell, mares loaded with empty baskets. These are filled by the ants and the mares return to their offspring.

In Mandeville and Bartholomew allegory is either wanting or used sparingly. But the purpose of both was to contribute to the edification of the saints.

There is some question whether Mandeville spent thirty-four years in the East, as he claimed, or traveled there at all. His tales, however, were popular reading during the period of discovery in the latter part of the fifteenth century, when the imagination was quickened by the return of explorers from new countries across the seas.

Besides Bartholomew and Mandeville there were several other authors whose descriptions of the wonders of nature found favor, among them Topsell's "History of Four-Footed Beasts and Serpents" (1658), Harrisons's "Description of Britain" (1577) and Lupton's "A 1,000 Notable Things" (1595). These were, in substance, similar to those from which we have quoted, and contain many of the same accounts, sometimes in new form.

Rather earlier than the publication of these came the re-discovery of Aristotle's history, and the effect was that naturalists again sought to learn by observation of real animals.

We see this influence in the work of Edward Wolton, an English physician, who published in 1552 his "De Differentibus Animalium." It was based on Aristotle, with additional matter.

In the year previous appeared Gesner's first of five volumes, a "History of Animals," of over three thousand pages and nearly a thousand excellent figures. His great service was the introduction of good illustrations. In his volumes are retained a few pictures of the sea-serpent and mermaids, but Gesner ranks as the most brilliant zoologist between Aristotle and John Ray.

It would appear that Ray was the Moses that led the theologians out of the wilderness, in publishing toward the close of the seventeenth century his "Wisdom of God Manifested in Works of Creation," which passed through twenty editions. Ray argued the adaptation of animals not only to man's uses, but to their own lives and surroundings.

This conception of "creative design" while it can not be regarded quite the modern scientific attitude, which would make every tub stand on its own bottom, did bring about some really good work. The science of the period was in full accord with the theological notion that animals and plants had for their main purpose, the "profit, instruction, enjoyment, and amusement of man."

Ray's work probably inspired Paley's "Natural Theology" of the same century, and led to the Bridgewater Treatises of the middle of the nineteenth. The latter was the fruit of a provision in the will of the Earl of Bridgewater, by the terms of which the President of the Royal Society selected eight persons, each of whom received a £1,000 for writing and publishing a treatise "on the power, wisdom and goodness of God, as manifested in the Creation."

The leading essays were Chalmer's "Adaptation of External Nature to the Moral and Intellectual Condition of Man," Bell's "The Hand as Evincing Design," Roget's "Animal and Vegetable Physiology with Reference to Natural Theology," Kirby's "Habits and Instincts of Animals with reference to Natural Theology."

Only the last bears directly on natural history. If the others are as good as Kirby's, the Bridgewater Treatises were a very great advance over anything that had come previously from the church.

Kirby's is almost entirely free from fable and contains much real zoological matter. Such scientific investigators as Lamarck and Owen are frequently quoted and the attempt to give a true account of animal life seems to be adhered to.

But the author never loses sight of his main purpose and he is very careful to keep strictly to the orthodox account of creation. Scripture content forces him to retain the dragon, but he gives him a zoological classification and would fix his native abode in subterranean waters.

# REASONING FROM ANALOGY AT ZUÑI

By ELSIE CLEWS PARSONS

NEW YORK CITY

EXCEPT in the most scrupulous scientific circles this type of thinking is prevalent and perhaps it is invidious to particularize its products in any given community. But during a recent visit to the Southwest I was so freshly impressed by the way pueblo life may be colored by such reasoning I am tempted to describe it in the setting presented to me, the daily life of the Zuñi and their life at times of individual crisis.

On the west side of Towa Yalene or Corn Mountain, the side facing the pueblo about three miles away, stands a great semi-detached, pinnacle rock, Akăipa, "Wide Rock, the Zuñi call it. Part of it from a certain angle would seem to represent a man followed by a woman with a child on her back. In one of the Zuñi myths the pinnacles represent the five children of the boy and girl once thrown in sacrifice off the top of the mesa into the mounting flood below. But whether from its conformation or the tradition attaching to it, either way by a process of analogy, the rock has become the gaol of phallic pilgrimage. Pictographs of the organs of reproduction are cut upon it in several places, thanks to more reasoning by analogy, and prayer plumes are planted in one of its secluded turns. Faces are cut on the plume sticks and on the stick for a boy a bit of turquoise blue is painted—in Zuñi classification the turquoise is male.

There is another phallic shrine not on but near the great mesa and again its magic is based on analogy. It is a hollow loop of piled up stones, open at one end—the *asha* or vulva no doubt, and, completing the symbol, half-buried, into the interior projects a longish stone. From this stone a bit is chipped and powdered and given in water to the would-be mother of a girl.

A would-be mother, one whose children have died, has still another method of imitative magic at her disposal. Every four years the Zuñi go rabbit hunting with their gods, *i. e.,* with the masked figures who personate their divinities. Foremost in the hunt is the figure of the Chakwena *okya,* the Chakwena woman. Before the hunt the blood of a rabbit has been rubbed on her legs and in the hunt she must take a straight line through whatever plants are in her course that the blood may be wiped off on them, thereby ensuring fertility alike to

rabbits and to the women of Zuñi. Rabbits are prolific and their young vigorous, hence, you understand, the connection. But an even more intimate association may be made between the Chakwena and the would-be fruitful woman. After the hunt the Chakwena retires to one of the sacred club-houses, the Hekiapa *kiwitsine, kiwitsine* of the nadir, and there for four days she lies in on the conventional child-birth sand-bed. During this confinement the would-be mother looks after her. An ear of corn represents the infant.

In beliefs about twins reasoning by analogy plays a part. Unless a woman wish to conceive twins she should not eat at the same meal venison and beef or venison and mutton. Besides, as deer, you see, bear twins, the woman who eats a piece of the wafer bread that has been taken on a hunt to be sacrificed to the deer, that woman will certainly bear twins—unless the bread has been passed four times around the rung of her house ladder.[1]

Would she give birth to a girl no man must be present in the house during her labor. As girl babies are much desired in Zuñi this belief is probably one of the reasons the resident American physician, a man, has no obstetrical cases among the Zuñi. The last child of my Zuñi hostess, a Cherokee married to a Zuñi, was a boy. She had wanted a girl. "But you should not have had in the American doctor then," her Zuñi friends had said to her, "nor the children's father."

Pregnancy lends itself generously among the Zuñi as elsewhere to analogy. No pregnant woman would look upon a corpse, her child would be still-born or born living would soon pine away. A pregnant woman is told too not to stand at windows, at delivery the child too would stay still before the prospect of the outer world; nor should she eat piñon nut, a rather greasy nut, as the child's head would be covered with grease, delaying its delivery. On the other hand to hasten parturition, one woman told me, a woman in labor should eat a bean—beans grow up quickly.[2]

Albinoism is caused, it is believed, by injudicious eating, by eating the white leaf within the husk of the corn, before conception if it is the father who eats, after it, if it is the mother. Pimples on the infant's face are caused during pregnancy by the mother sprinkling bran on the floor of her oven—a Zuñi method of testing for temperature. Birth marks or deformities of one kind or another are also caused by care-

[1] In this discharming act I suspect some analogy, but I fail to clearly distinguish it.

[2] To the Hopi woman a bit of weasel is given to eat—weasels go quickly through a hole. On the wrist of her infant son a Hopi ties a *bi-mo-nuh*, a very swift running insect—to make the boy a good runner. (Owens, J. G., "Natal Ceremonies of the Hopi Indians," pp. 165, 173. *J. Amer. Ethn. and Archeol.*, II. (1892).)

lessness on the part of one parent or the other before the birth of the afflicted child. The carelessness may be in connection with some ceremonial or with some animal. Some feature of the ceremonial would seem to be "caught" by the child. A member of the Newekwe Fraternity told me, for example, that his son was marked at birth with the print of an entrail across chest and forehead. It was to have been expected, for during his wife's pregnancy had he not taken part in his fraternity's ceremonial, a ceremonial peculiarly concerned with animal entrails?

Hunting is taboo an expectant father, lest his child suffer in some way analogous with that his quarry suffers. Were a rabbit or a prairie dog shot in the eye or wounded in the leg, the child would be born blind or lame. The head of one little girl I knew was a bit flattened on one side, because, they said, her father had gone prairie-dog shooting before she was born and he always shot his prairie-dogs in the head. The jaw of a kinsman of this child was malformed, under size and twisted to one side. One of his parents had perhaps broken the jaw of a sheep, it was said, before his birth. A baby that cries all the time is supposed to have pain in its back and this is caused by his father having overdriven his horses, his whip presumably to their backs, before the birth of the child. But the greatest casualty to which a man may subject his unborn offspring comes of killing a snake. The child will be marked like a snake, oh ye shades of Elsie Venner!—and die.

Were a child slow in teething, a man who had been bitten by a rattlesnake would be called in. He would rub the gums of the infant and dentition would follow—rattlers, one is told, have two teeth. It would not do to use a comb on a baby's head; for its teeth would come in brittle and spaced wide, like the teeth of a comb.

That a baby may not cry too much during its infancy, soon after birth its attendant holds her hand over its mouth. A wakeful baby is charmed to sleep by a feather under its pillow. It is the feather of the *mewichokwe,* a bird that sleeps much of the time.[3] This feather was once used too for obvious reasons in war magic. When preliminary to an attack upon their hereditary enemy, the Navaho, the Priest of the Bow crept at night into the Navaho encampment, he would bury there a prayer plume, a stick with six feathers, the feathers of the four birds sacred to the gods of war, the eagle, the duck, the hawk, the, in Zuñi, *tsililigo.*[4] The fifth feather is that of the *aake* (named from

[3] Among the Hopi the leaves of a plant named for the bat are used. (Hough, W., "The Hopi," p. 58. Cedar Rapids, 1915.)

[4] The "dancing" bird I used to call it from its conspicuous flights at dawn. After a brief sail through the air it stops short and for a few moments in just the same spot it works its wings even more vigorously than a dancer his legs. That *is* its dance, say the Zuñi. Whether from this analogy or not the

its call), a fool bird as we would say, a bird which flutters about without a purpose, irresponsibly, so to speak. The sixth feather is that of the *mewichokwe*. A *mewichokwe* feather in their midst, the enemy is naturally drowsy and off guard and the next morning when they do wake up they lose their heads like the *aake* and go wandering about, aimless and weaponless, easy victims to the ambushed Zuñi.

From the soporific functions of a bird I pass to the detective functions of a deer. The wife of a man out hunting is supposed to "stay still," not to leave the house except at noon time to fetch water. On the way to the well she will sprinkle the sacred meal. It is the time when her hunting spouse will be thirsty, and when the deer will begin to move about. If that afternoon the hunter is successful, he knows his home-staying wife is properly devoted to him. If he is unsuccessful, he suspects her of gadding about. Of worse things even he will suspect her if he see a buck and a doe together and the buck mounting the doe. It is the way the deer take to "tell" him what is happening at home. He has then to kill the deer and take out their hearts. On his return home he will find both his wife and her lover sick. And unless he rub them with deer heart mixed with meal, the woman with the heart of the doe, the man with that of the buck, they will die.

The dead are buried with their head to the East, ready to arise, one informant suggested, facing Kothluwala, the Sacred Lake to which they are to journey, a journey sixty-five miles to the west of Zuñi. People will not sleep with their heads to the East. And a child who falls asleep careless of its position will be asked, "Why do you want to sleep like a dead person?"

longish tail feathers of this bird are much prized for prayer plumes. A little fellow in my household caught a *tsililigo* in a hair trap one morning and straightway he had out the tail feathers from the still living bird and had carried them to his grandfather.

# LOST MOUNTAINS OF THE PRAIRIES

By CHARLES KEYES
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NOWHERE perhaps on the face of our globe does there exist a bit of landscape more picturesque, more unexpectedly novel, or more curiously wrought into strong contrasts of relief than that found about the point where meet the three great prairie states of Iowa, Minnesota and South Dakota. It is in the very midst of the Great Plains which stretch out unbrokenly from the Arctic ocean to the Mexican gulf. It is a part of that tract which early French explorers and *coureurs de bois* were pleased to call the Coteau des Prairies; and which an English trapper designated the Height of Land. For its size and altitude it is the most scenic spot on earth.

In this region are perfectly represented in miniature some of the grandest relief features of every clime: Grand Canyon of Arizona, the Royal Gorge of Colorado, the majestic escarpment of Glorietta, the pinnacled Dolomites of the Eastern Alps, the rock-walled lakes of northern Italy, the boiling rapids of Finnish Imatra, the leaping brooks of Norway, the broad water-curtain of Niagara, and about all the boundless Girghiz steppes. In days gone by also there covered this land glaciers compared with which existing ice-fields sink into utter insignificance. Formerly lofty volcanoes poured forth their floods of molten rock. Alone of all great landscape types mountains are missing. Once these too were here; but to-day they lie buried beneath the level of the singularly flattened and monotonous prairies.

At the present time there are, within the limits of the area of which we speak, few traces in any of the relief features to indicate that there ever existed here a high and mighty mountain range. The ground is perhaps a little higher than it is either to the east or to the west. The country to the north is indeed a low watershed. Plain is the dominant topographic expression of the entire region. In all directions the eye has unobstructed view for distances of many miles. Even the horizon is unbroken by hill-form or valley depression; it is as straight as the sky-line at sea. Travelers at the railroad stations see afar a full half-hour before the train arrives the black smoke-cloud of the approaching locomotive.

Of the lofty mountains which once loomed up on the horizon every vestige at the surface has long since vanished. They are leveled to the sea, lost and forgotten. To-day their foundations are being slowly

FIG. 1. CANYON OF THE SIOUX RIVER; a remarkable meeting of antithetical relief types.

exhumed by the corroding action of stream and rain; and here and there the old structures are being brought to sky. The traces are many but inconspicuous. Recently through means of the records of many deep-well borings and other data the height, extent and form of the

FIG. 2. DEPTHS OF THE SIOUX CANYON AT THE DELL RAPIDS.

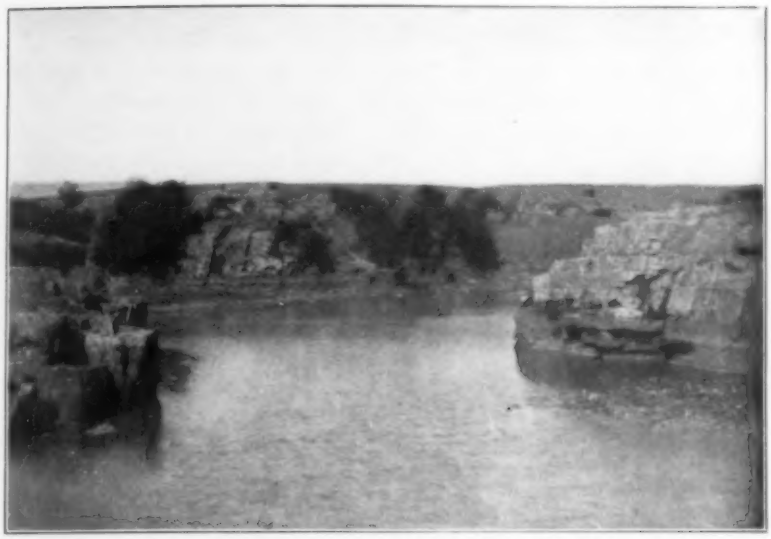


FIG. 3. JASPER POOL: an old canyon filled with glacial débris.

ancient mountain range has been fully figured forth, and its characteristic features pictured out. This great earth-wrinkle which sprang from the sea in Mesozoic times extended from the east shore of present Lake Superior southwestward beyond the path of the Missouri River. Medially the rocks were bowed up more than a mile above the existing level of the prairies. In their prime these Siouan mountains rivaled in scenic beauty and grandeur the Adirondacks, the southern Appalachians or the Juras of to-day. Then Jove and Boreas and Vulcan each laid claim to them; and each did his work of demolition quickly and well. They reduced the majestic pile of adamantine down to the very level of the ocean, when Neptune gathered it to his own.

Although now no remnant of former mountains remains in the relief expression of the region and the entire area of once high altitudes is as level and as smooth as any other part of the vast interior plain there persists beneath the glacial mantle mountain structures as well pronounced and as typical as they are anywhere else in the world. The broadly arched strata, the folded formations, the faulted rocks, the intrusions of once molten magmas, the prodigious extravasations of volcanoes, are familiar features which here are characteristically developed. The evidences of orogenic uprisings are unmistakable. Seldom to the geologist are mountain phenomena more clearly depicted. Form, extent and stratal attitude are measurable with great precision.

The discovery of the old and long-buried mountain range is a matter so recent and so instructive that a brief statement of the manner of its finding is not without distinct interest. It well illustrates the

method of modern scientific venture beyond the confines of the known. By peeling off, as it were, the thick Cretacic and glacial coverings of the area the entire Mesozoic floor is laid bare, and the Paleozoic formations then constitute the uninterrupted bed-rock of the whole region. By what is essentially the same thing elimination of these later coverings is accomplished by plotting the numerous deep-well records and other data relating to the underground structures.

Casually referring to a general geological map of the area, the various Paleozoic terranes are seen to be distributed in relatively narrow belts trending in a northwest direction. Singularly these belts in southern Minnesota abruptly terminate. The cause has been long perfectly inexplicable. It is now found that the most ancient rocks form the core of a rather notable arch, the axis of which is directed northeastwardly. It is a true anticline structure of large proportions and great longitudinal extent. After the country had been bowed up it was planed off quite to sea-level. It is against this anticline that the belted Paleozoics are upturned and cut off. Indeed, they too once extended unbrokenly over the old arch. In northern Minnesota and in Manitoba the same belted formations abruptly appear again. The discovery is a result of inductive reasoning that is quite remarkable. The whole problem was in fact fully worked out before its proofs were even sought in the field. Lines of reasoning and results of extensive direct observation are in strictest accord. Discovery was made before the facts themselves were even presented.

Rarely in so small compass is there so well displayed the effects of every great geologic process known. For countless ages fire, flood and frost have played upon these rocks without completely effacing

FIG. 4. PALISADES OF THE SIOUX RIVER, rivaling those of the Hudson and the Rhine.

FIG. 5. SPIRIT CANYON; more impassable than the Royal Gorge.

them. Volcanic outbursts have seamed, seared and smelted these formations until often they are almost beyond recognition, but they are not yet destroyed. When rains have failed to wash these rocks away or the rivers have been unable to wear them down, the sea has time and again cut into them or carried them hundreds of fathoms deep, yet they have reared themselves again above the surface of the engulfing waters. Heat of sun and chill of ice have alternately contended in flaking off the rock surface; still they have ever presented new faces to these insidious attempts at their destruction. Winter blasts and the siroccan winds of summer have blown the rock-areas bare and clean as a city

FIG. 6. THE SIOUX FALLS; near which Gitche Manito the Mighty once touched Earth.

FIG. 7. GLACIAL SCORINGS ON AN ICE-PLANED SURFACE OF SIOUX QUARTZITE.

pavement, and the wind-blown sands and dusts have rounded off all corners and polished all surfaces until the hard vitreous blocks appear as if fused in a furnace, without seemingly making any marked impression. Continental glaciers have repeatedly passed over the region, planing off the glassy masses as a joiner does his beam of wood, and deeply grooving the smoothed facets as by some giant graver. Compression and arching of the earth's crust have uplifted the country into mountains, but they have signally failed to destroy the rocks.

FIG. 8. FAMOUS PIPESTONE QUARRY: for fifty centuries the calumet has been the symbol of universal peace.

The sudden appearance and rapid decline of the Siouan mountains on the mid-continental horizon are incidents of the Mesozoic age of geologic history. Brief, brilliant, almost pathetic are the succession of chief events. The main uplifting took place during the Triassic period. In the succeeding Jurassic and Comanchan times all of the ranges were completely razed to the present plains-level. During Cretacic time the waters of the ocean again rolled unbrokenly over the old base-leveled region, and the bared foundations of the former mountains formed the bottom of the broad epi-continental sea. No great orogenic uplift was ever more rapidly or more completely obliterated. It is one of the marvelous episodes in the long history of the North American land contest.

In still another way the Siouan area is quite notable—perhaps the most remarkable spot of our country. It is one of the completest of outdoor laboratories for geological instruction. With an areal extent scarcely larger than that of some of our larger cities it is a unique study-ground. It is a veritable geologic *multum in parvo*. In this circumscribed district is represented every known category of the geological agencies. The whole panorama of geological science is spread out before one's eyes. Apt illustration abounds of the major phenomena pertaining to the origin, structure and modification of the earth's crust.

The Siouan area is a locality where the cardinal principles of earth science may be best taught by example, and in the least possible period. In a week's time the entire list of principal processes and products may be passed in review in the field. In going to and from this spot another week's time permits examination of the most complete stratigraphic section of the continent and a review of the evolution of life generally. As the culmination of a year's study of geological science indoors this place is well worth a visit by every college student and teacher in geology. It is, in fact, the most typical, most compact, and illuminating area yet revealed wherein students may perform in a little while extensive geologic field-work of a most practical kind. It is here that the outlines of field-geology are acquired at a glance. The foundations are here quickly laid for all the broader and subsequent geologic excursions into the farthermost points of earth.

The realm of the ancient Siouan mountains is also famous in poetry and Indian lore. Principal scenes of Longfellow's "Song of Hiawatha" are laid here, although when he wrote the epic it is not probable that the poet had ever been nearer the place than the Cambridge gardens on the shores of Back bay.

In the unwritten annals of the Sioux Indians, who once roamed over a large part of the continental interior, the Des Moines river was known as the Inyan-Sha-Sha-Watpa, literally, "Stone-red-red river," or the Redstone river. This Indian name has peculiar significance. When European eyes first beheld it and for a period of more than two centuries thereafter this noble stream was the only all-water route in all the land by which without getting out of his boat Indian and fur-trader could traverse the continent from the Arctic Ocean to the Gulf of Mexico.

The headwaters of the Des Moines River, or Inyan-Sha-Sha-Watpa, are in the red quartzite district of the old Siouan mountains; but the red stone is the more famous catlinite found associated—the much-sought stone from which the calumet or peace-pipe was wrought. From the pipestone ledges of the broad prairies spread peace on earth and good will towards men to the farthermost limits of the continent, to

FIG. 9. JUXTAPOSITION OF OLDEST AND YOUNGEST ROCKS OF EARTH.

the remotest corner of the Indian world. Forty centuries before the Nazarene appeared on earth this spot was solemnly consecrated to the cause of world-wide peace. Peace at once reigned among warring nations wherever the smallest fragment of this red rock was carried. The redstone calumet was the most potent power in the adjudication of international disputes that ever came into the hands of man. It would have been most fitting had the great Temple of The Hague been erected over the quarry from which this magic stone is obtained. It is yet left to us to rear on this spot some noble shaft to point out by simple symbol the highway to universal peace.

Far View House, Mesa Verde National Park, Colorado, View from the South. *(Photographed by G. L. Beam.)*

# THE PROGRESS OF SCIENCE

## *ARCHEOLOGICAL WORK IN THE MESA VERDE NATIONAL PARK IN 1916*

DURING the summer of 1916, Dr. J. Walter Fewkes, ethnologist of the Bureau of American Ethnology, at the request of the Department of the Interior, uncovered in the park a large mound of stone and earth near Mummy Lake, within sight of the government road and a little over four miles from Spruce-tree camp. The building brought to light, shown in the illustration, is a community house of the pueblo type, and is highly instructive as the first of its kind ever excavated on the plateau. Its bearing on the morphology of pueblo architecture is regarded as of scientific importance.

From the summit of the mound chosen for excavation, there is a wide outlook into four states—Colorado, Utah, New Mexico and Arizona—which has suggested the name, Far View House. The mound was both the most important and the largest member of a group of mounds, sixteen in number, irregularly scattered over an area a half mile north and south, and about half the same distance east and west. Each mound in the group is surrounded by a level space showing evidence, in places obscure, of irrigation ditches from a reservoir of considerable size, misnamed Mummy Lake, situated at the northern border of the area. This group of mounds is typical of several others found in clearings among the cedars on top of the plateau. These clearings can easily be detected by a dense growth of sagebrushes, covering mounds with worked stones strewn over their surfaces but not now arranged in walls.

It has been recognized for several years that these clusters of mounds indicate the existence of open sky buildings, but the forms and architectural features of these concealed structures were unknown. It was, therefore, thought to be an important work to open one of these mounds to serve as a type for comparison with other prehistoric dwellings in the park, especially the cliff dwellings. Similar mounds occur in other regions of the southwest, the first requisite for a morphological comparison with which would be a knowledge of architectural characters impossible to obtain from a superficial examination of the mounds.

In surface features the mound chosen for study does not differ from others in the same cluster. Each has a depression in the center, and is accompanied by a low mound, the surface of which was bare of artificially worked stones, situated a few feet to the east or south. This smaller mound is the cemetery, the greater part of which had been dug over by seekers for mortuary pottery. The scarcity of salable objects found in the larger mounds has preserved these mounds, although trenches have been dug across them to determine that fact. The first work to be done by the systematic archeologist was to cut off the bushes and remove fallen stones and accumulated soil. When this had been accomplished there was revealed a rectangular building facing south, measuring 113 feet long on the north, by a hundred feet on the east side. Within this enclosure closely packed together were rooms, while on the south side there was revealed a court surrounded by a wall a few feet high. The building uncovered was formerly three stories high on the north side, sloping in terraces toward the south from which the distant view above referred to is spread before the visitor. It is estimated that

MODEL OF FAR VIEW HOUSE, MESA VERDE NATIONAL PARK, COLORADO, FROM ELEVATION OVER SOUTHWEST ANGLE.

the highest or north wall, now reduced in height, formerly measured about 18 feet. No doorways were found through the surrounding wall, a fact suggesting the use of ladders to mount to the terraces. Within the surrounding walls there were no evidences of streets or courts, but the walls of all the rooms were compactly united, necessitating entrances to many of the rooms through hatchways in the roof. Several rooms, however, could be entered directly from the court on the south side.

It was evident from the inception of the work that Far View House was formerly inhabited. Numerous objects of household use were found in the rooms, several of which had fireplaces in their floors, while others showed evidence of smoke on their walls. Mills for grinding corn, still in place, emphasized the fact of former human occupancy and showed their domiciliary use.

Two different types of rooms occurred in this unique building. The most prominent were circular in form. One of these measured 32 feet in diameter and occupied the middle of the building, and around it there were irregularly placed three others. The shape and other features of these rooms indicated ceremonial rooms constructed on the same lines as similar rooms in the cliff dwellings.

By far the larger number of rooms in Far View House are rectangular, often with passageways from one to another. They served for storage of food or other wealth, and for shelter, but many occupations as cooking and manufacture of pottery of the inhabitants must have been performed on the terraced roofs of these buildings.

The architectural structure of Far View House indicates that it was a pueblo or community building, differing mainly from neighboring cliff dwellings in its situation and lack of cave covering. The similarities in construction show an identity in culture of the inhabitants. The cliff dwellers and inhabitants of the mesa villages were the same people.

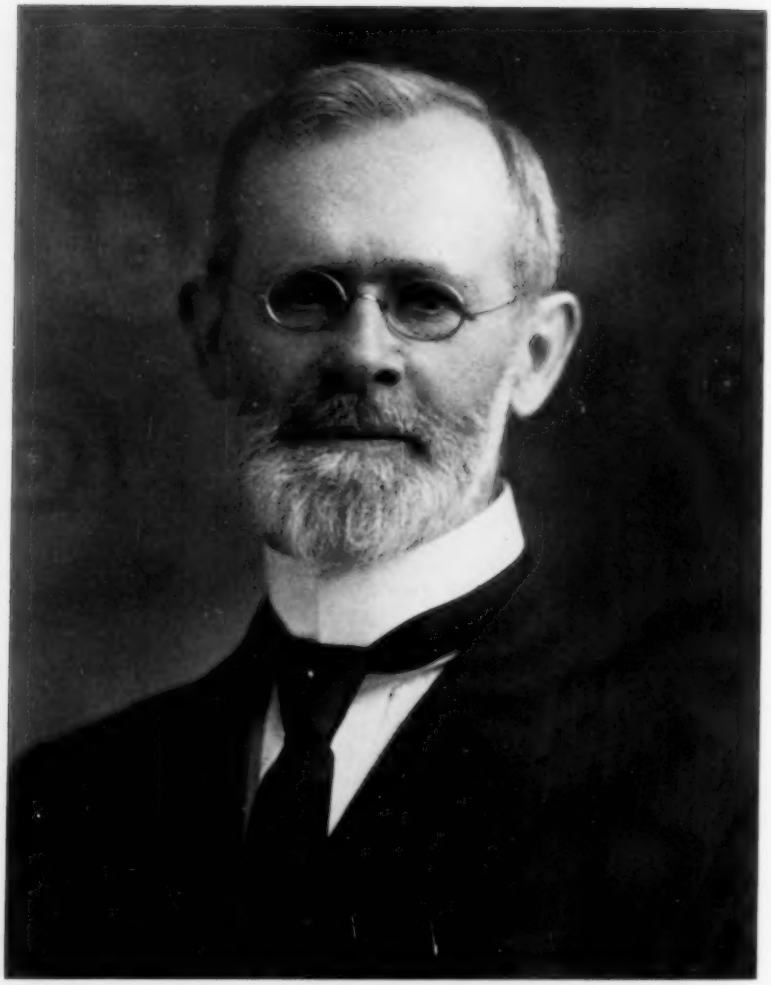
The relative age of Far View House and a typical cliff dwelling, like Cliff Palace, is impossible to determine, but the indications are that the open-air house was built later than the dwelling protected by the overhanging roof of a cave. We have no means of determining the chronology of either in terms of the Christian era. The amount of accumulation of wind-blown sand in the rooms and the reduction in height of the tops of the walls by stones falling from them show that considerable time had elapsed since Far View House was abandoned. The causes that led the inhabitants to desert Far View House, and what became of them are in part suggested by a comparison of the form of

Far View House with that of other ruins. The essential features of the type are its rectangular form and round kivas with rooms in a compact mass. Similar ruined peublos occur in several localities in Colorado and northern New Mexico but we have good reason to believe that this type of building is characteristic of a circumscribed area and is no longer erected. The people who lived in houses of the same type some distance from Mesa Verde must have brought to that plateau this peculiar form, or the inhabitants of the Mesa Verde must have carried the same type into distant regions of the area where the type occurs. The indications are that the latter supposition accounts better than the former for the diffusion of the type.

The cause of the desertion of the Mesa Verde buildings may be found in a desire to settle in better localities, as their numbers increased. No indication of a drying-up of the country, by which the crop of their food material was lessened, is in evidence, for it is probable that corn, their main food supply, could still be harvested near Far View House, especially by a people acquainted with artificial irrigation. An increase in number of inhabitants may have given them confidence that they could defend themselves from any enemies, if they descended to the river valley, and led them to emigrate, not as a body, but in small bands, appropriating localities better suited for agriculture than the farms they once had. Constant bickering of clans, disease, quarrels of various kinds had much more to do with hastening their departure than inroads of aliens or hostile nomads.

Far View House probably shares its architectural characters with other buildings on top of the mesa. All the different modifications in external form of Mesa Verde pueblos can be known only after others are uncovered, but the indications are they have certain features in common. Among these may be mentioned the central circular ceremonial room, the rectangular chambers clustered about it with partitions united to it, and the fortification-like wall surrounding them both. It is evident that in this type defense is combined with habitation, but the enemies to be feared were mainly domestic, not foreign. Enemies from the valley could not make their way to the top of the mesa and attack these towns with any show of success. Far View House was built for protection against men of their own tribe. Each group of mounds was composed of similar buildings. Those of the same group may have been peacefully disposed to each other, but judging from what we know of the pueblos of the present day, each cluster had frequent conflicts with their neighbors over ownership of the scanty water supply or boundaries of their farms; even trivial disagreements over rabbit hunts or other matters may have led to serious consequences.

It is desirable now that one of the villages in the Mummy Lake group is uncovered to continue this work with a view to determine the relationship to it of other adjoining habitations, now in ruins. Questions of social organization of the inhabitants of the different pueblos of a group with a partial amalgamation are important, and facts bearing on other points may be gathered by renewed archeological activity on the mesa. Nowhere are conditions for the study of primitive American architecture more propitious than here, where different types of prehistoric buildings occur a short distance apart. Once determined on the Mesa Verde, the character of prehistoric social life here discovered may afford a good type for comparison of culture in other ruins scattered over a wide territory of the southwest, survivals of which are detected in the inhabited pueblos, for it must be borne in mind that the Mesa Verde and neighboring country is regarded as the place where the pueblo culture originated. It might be added that here it reached its highest development in architectural forms.



CLEVELAND ABBE

In whose death America has lost its most distinguished meteorologist.

GEORGE ROBERT WHITE MEDAL OF HONOR
MASSACHUSETTS HORTICULTURAL SOCIETY AWARD TO
WILLIAM ROBINSON MCMXVI
FOR EMINENT SERVICE IN HORTICULTURE

THE GEORGE ROBERT WHITE MEDAL OF HONOR.

### THE GEORGE ROBERT WHITE MEDAL OF HONOR FOR HORTICULTURE

IN the year 1909 Mr. George Robert White, of Boston, presented to the Massachusetts Horticultural Society a fund, now amounting to $7,500, the income of which is to be devoted annually for the purpose of providing a substantial gold medal to be awarded by the executive management of the society to the man or woman, commercial firm or institution in the United States or of some other country that has done the most in recent years to advance the interest in horticulture in its broadest sense. This award is to be known as the George Robert White Medal of Honor and has been awarded every year since its foundation.

The awards thus far made are as follows:

1909. To Professor Charles S. Sargent, director of the Arnold Arboretum, Jamaica Plain, Mass.

1910. To Jackson Thornton Dawson, the well-known and accomplished plantsman of the Arnold Arboretum.

1911. To Victor Lemoine, of Nancy, France, the originator of many of the popular varieties of flowering plants to be found in the gardens of to-day.

1912. To Michael H. Walsh, the rose specialist of Woods Hole, Mass., the originator of the Lady Gay rambler rose and of many other popular varieties.

1913. To the Park Commission of the City of Rochester, N. Y., in recognition of its tasteful work in landscape planting.

1914. To Sir Harry James Veitch, of London, England, seedsman and nurseryman, and the introducer and propagator of many desirable ornamental garden plants.

1915. To Ernest Henry Wilson, of Boston, for his botanical and horticultural work in China and Japan and the discovery of many new varieties of flowering plants, shrubs and trees.

1916. To William Robinson, of London, England, for his educational work in horticultural literature.

The medal is of coin gold, weighs eight and a half ounces, and is struck at the Mint of the United States in Philadelphia. It was designed by John Flanagan, the eminent medalist, and is considered a work of much artistic merit.

The award of this medal every year is of value as a recognition of the labors of those who have done so much for the advancement of the interest in horticulture and who have added to the enrichment of our gardens.

## THE COUNCIL OF NATIONAL DEFENSE

THE Council of National Defense and its advisory commission, composed of civilians, have decided to appoint seven committees to further develop the program for the mobilization of the resources of the country. They have issued the following statement:

The program of the council and commission has for its object the provision of an adequate military and naval defense based on an adequate industrial and commercial coordination and preparation. To attain this end, a definite, immediate and continuing program is being worked out.

The commission has divided into committees. A member of the commission is the chairman of each of the committees. Committees have been formed to take charge of the following subjects, and other committees will be formed as they may be needed.

*A.* Medicine, including general sanitation, Commissioner Franklin H. Martin, chairman.

*B.* Labor, including conservation of health and welfare of workers, Commissioner Samuel Gompers, chairman.

*C.* Transportation and communication, Commissioner Daniel Willard, chairman.

*D.* Science and research, including engineering and education, Commissioner Hollis Godfrey, chairman.

*E.* Raw materials, minerals and metals, Commissioner Bernard Baruch, chairman.

*F.* Munitions, manufacturing, including standardization and industrial relations, Commissioner Howard Coffin, chairman.

*G.* Supplies, including food, clothing, etc., Commissioner Julius Rosenwald, chairman.

The chairman of each committee will call a series of conferences with representatives of trades, businesses or professions. At such conferences the representatives shall be asked to organize so as to deal with the council through one man or through a committee of not more than three men, to whom the council shall submit problems which may affect the national defense and welfare.

One or more members of the council will meet the conferees and set forth the desires of the government and its needs. To quote the words of the enabling act, these needs are "the creation of relations which will render possible in time of need the immediate concentration and utilization of the resources of the nation."

## SCIENTIFIC ITEMS

WE record with regret the death of Edward Dyer Peters, professor of metallurgy, and Charles J. White, professor emeritus of mathematics, Harvard University; of Arnold Valentine Stubenrauch, professor of pomology, University of California; of Jules Dejerine, the French neurologist, and of Friedrich Hahn, who occupied the chair of geography at Königsberg.

THE portrait by Henry Ulke of Joseph Henry, first secretary of the Smithsonian Institution, has been transferred by a senate resolution, from the capitol to the Smithsonian Institution, where it has been hung in the National Gallery of Art, in the new building of the National Museum.—The library of the late Professor Hugo Münsterberg has been given to Harvard University by a group of his friends. The library consists of about 10,000 books, reprints, pamphlets, manuscripts, charts and other papers.

DR. VERNON M. SLIPHER, for many years chief assistant at the Lowell Observatory, known for his spectroscopic researches, has been appointed director of the Lowell Observatory in succession to the late Percival Lowell.

THE National Canners' Association has offered Harvard University the sum of $20,000 annually for a period of three years to carry on an investigation of food poisoning or so-called ptomaine poisoning, with special reference to canned goods. The offer has been accepted by the university, with the understanding that the investigation shall be conducted and the results thereof published with entire academic freedom. The study will be made at the Medical School under the direction of Dr. M. J. Rosenau, professor of preventive medicine and hygiene.